Technical Report GL-93-11
August 1993

US Army Corps
of Engineers
Waterways Experiment
Station

Investigation of Ephemeral Gullies in Loessial Soils in Mississippi

by Lawson M. Smith
Geotechnical Laboratory

Approved For Public Release; Distribution Is Unlimited

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3909 Halls Ferry Road
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Final report

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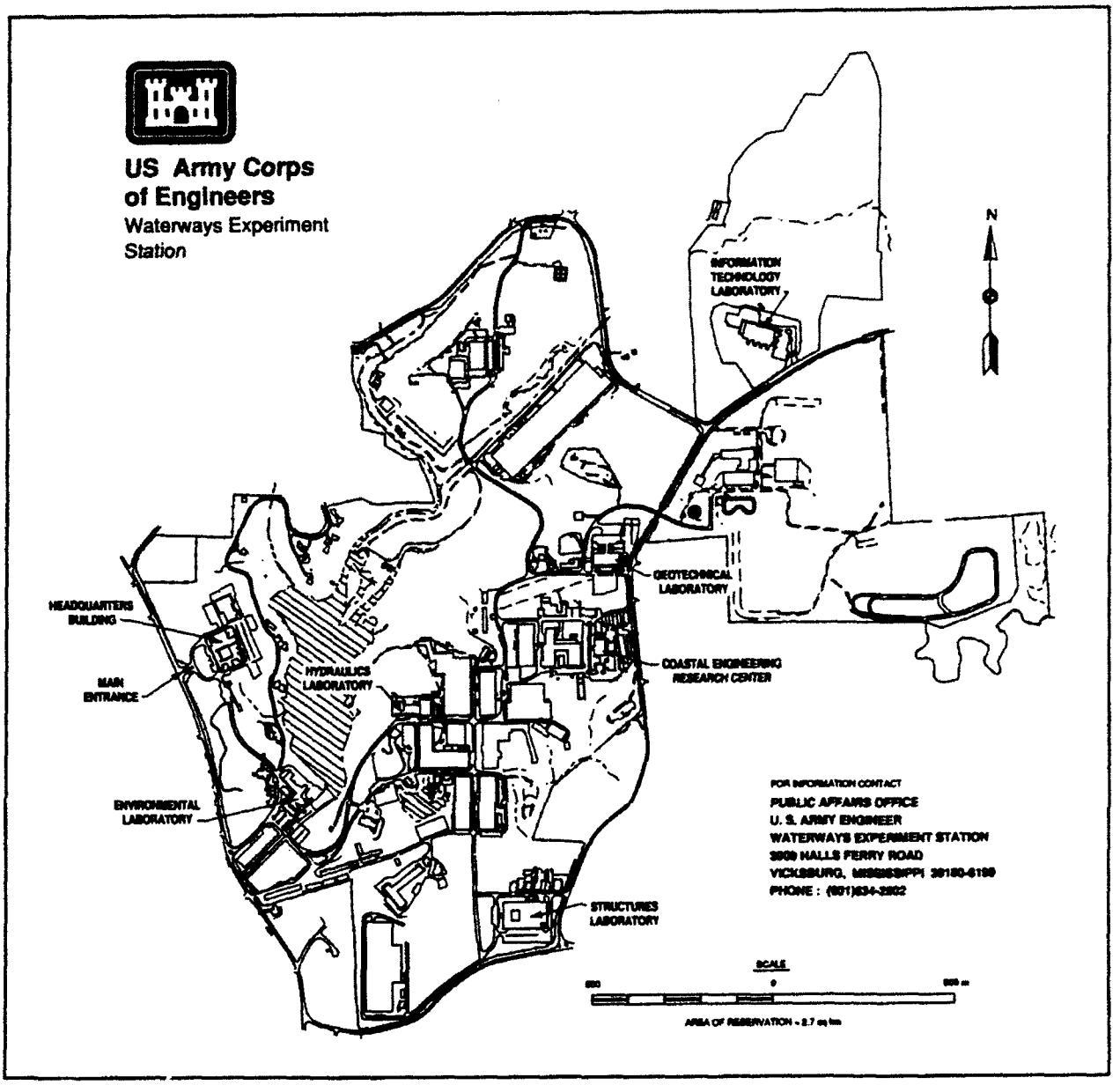
100 West Capitol Street
Jackson, MS 39269



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Contents

Preface

The U.S. Army Engineer Waterways Experiment Station (WES) was authorized to conduct this study by the U.S. Department of Agriculture, Soil Conservation Service (SCS), Jackson, Mississippi, during the period January 1983 to September 1991. The study was conducted by Dr. Lawson M. Smith, Engineering Geology Branch, Earthquake Engineering and Geosciences Division, Geotechnical Laboratory (GL), WES. The SCS Technical Monitors were Mr. Peter Forsythe and Mr. Ross Ulmer.

Dr. Smith was assisted by Mr. Bennie Washington, Mrs. Ruthie Lipscomb; Mr. Peter Church, Engineering Geology Branch, and Mr. Lester Flowers, Rock Mechanics Branch, Soil and Rock Mechanics Division; Ms. Benita Allen, Rock Mechanics Branch; and Ms. Glenda Morgan, Soil and Rock Mechanics Division, GL.

Mr. Washington played a substantial role in the investigation of the ephemeral gullies through his assistance and field studies, reduction of field data, and drafting of all the figures and illustrations in the report. Mr. Flowers also played a substantial role through the establishment of the gully sites and frequent field data acquisition. Ruthie Lipscomb and Peter Church also contributed to field data acquisition and reduction of data. Benita Allen and Glenda Morgan prepared the computer data files for the ephemeral gullies. Mr. Robert F. Anderson, Rock Mechanics Branch, designed and supervised the fabrication of the gulliometer.

The project was conducted under the general supervision of Mr. Joe L. Gatz, Chief, Engineering Geology Branch, and Dr. A. G. Franklin, Chief, Earthquake Engineering and Geosciences Division.

General direction was provided by Dr. W. F. Marcuson III, Director, GL.

At the time of publication of this report, Director of WES was Dr. Robert W. Whalin. Commander was COL Bruce K. Howard, EN.

Conversion Factors, Non-SI to SI Units of Measurement

Non-SI units of measurement used in this report can be converted to SI units as follows:

Multiply	By	To Obtain
acres	4,046.873	square meters
cubic feet	0.02831685	cubic meters
feet	0.3048	meters
inches	2.54	centimeters
square feet	0.09290304	square meters
tons (*mass*) *per square foot*	9,764.856	kilogram per square meter

1 Introduction

Background

At the request of the Soil Conservation Service (SCS), Jackson, Mississippi, the U.S. Army Engineer Waterways Experiment Station (WES), in September 1982, submitted a proposal to conduct an investigation of ephemeral gullies in loessial soils in Mississippi. The proposal was submitted to the SCS in December 1982 and approved by the SCS in January 1983. In June 1983, a contract was awarded to Colorado State University (CSU) to conduct data analysis and development of predictive methods for ephemeral gullies based on the data developed by this study. The scope of work for this contract is included in Appendix A. In December 1983, the ephemeral gully study was expanded to cover additional periods of field measurement.

Soil erosion is a major problem facing the United States and the world. As a principal resource base for the production of food, soil is a limited resource which under certain circumstances has been largely eroded. Soil erosion in croplands occurs primarily by three processes: sheet erosion, rill erosion, and the development of ephemeral gullies. Ephemeral gullies are defined as small drainage ways which develop seasonally between cultivation practices, and which, if not filled in, would become permanent features of the drainage network. Ephemeral gullies may reach a width of 2 to 3 ft and a depth of 1 to 1-1/2 ft. Presently, there are several methods to predict sheet and rill soil erosion on croplands. The accepted procedure is the use of universal soil loss equation. Thorne (1984) developed a procedure for predicting soil loss for ephemeral gullies (contract to CSU in June 1983). Thorne's Ephemeral Gully Erosion Equation (EGEE) is described later in Chapter 4. However, the total amount of soil loss from croplands is often significantly underestimated since ephemeral gully soil erosion is usually not predicted in practice.

Purpose and Objectives

The purpose of this investigation was to obtain detailed data on ephemeral gullies at various sites in Mississippi for use in the development of procedures to predict the development of ephemeral gullies. The data developed in this

study will be used by several other researchers in their efforts to develop predictive methods in ephemeral gullies.

There were five specific objectives of this investigation:

a. Establish four gully measurement sites in loessial soils in central Mississippi.

b. Develop an accurate and efficient procedure for measuring ephemeral gullies in the field.

c. Gather gully measurement data for the field sites which accurately describe the development of ephemeral gullies and which quantify the amount of soil loss per year, per acre, due to ephemeral gullies.

d. Provide observations on the development of ephemeral gullies at the field sites.

e. Make recommendations on the use of the data gathered and procedures for acquiring additional data.

2 Methodology

Selection of Sites

Site selection was completed by the staff of the Soil Conservation Service, Mississippi State Office, the Waterways Experiment Station, and the Soil Survey Staff–Yazoo, Hinds, Madison, and Warren Counties. A number of sites were examined in Yazoo, Hinds, Madison, and Warren Counties to find sites which represented gully erosion and several types of soils developed in loess. These soils included the Memphis, Providence, Grenada, and the Loring soils.

After examination of a number of sites in each of the four counties, four sites were selected in Warren, Hinds, and Madison Counties (Figure 1). Sites 1 and 2 are both of Memphis soils and occur in Warren County. Site 3 is Loring soil and occurs in Hinds County. Site 4 is Providence soil and is in Madison County. The four sites are identified as follows:

a. Site 1, Memphis soil–Herbert Downey Farm; Warren County; southeast 1/4, Section 25, T15N, R4E; Big Black 7.5 min U.S. Geological Survey quadrangle; sheet 68, Warren County Soil Surveys; land use soybeans (Figure 2).

b. Site 2, Memphis soil–Herbert Downey Farm; Warren County; northeast 1/4, Section 36, T15N, R4E; Big Black 7.5 min U.S. Geological Survey quadrangle; sheet 68, Warren County Soil Survey; land use soybeans (Figure 3).

c. Site 3 Loring soil–Bobbie Mellon Farm; Hinds County; southeast 1/4, Section 18, T6N, R2W; Raymond 7.5 min U.S. Geological Survey quadrangle; sheet 14, Hinds County Soil Survey; land use corn (Figure 4).

d. Providence soil–James Goodlow Farm; Madison County; northwest 1/4, Section 10, T9N, R3E; Sharon 15 min U.S. Geological Survey quadrangle; (soil survey incomplete for Madison County); land use soybeans (Figure 5).

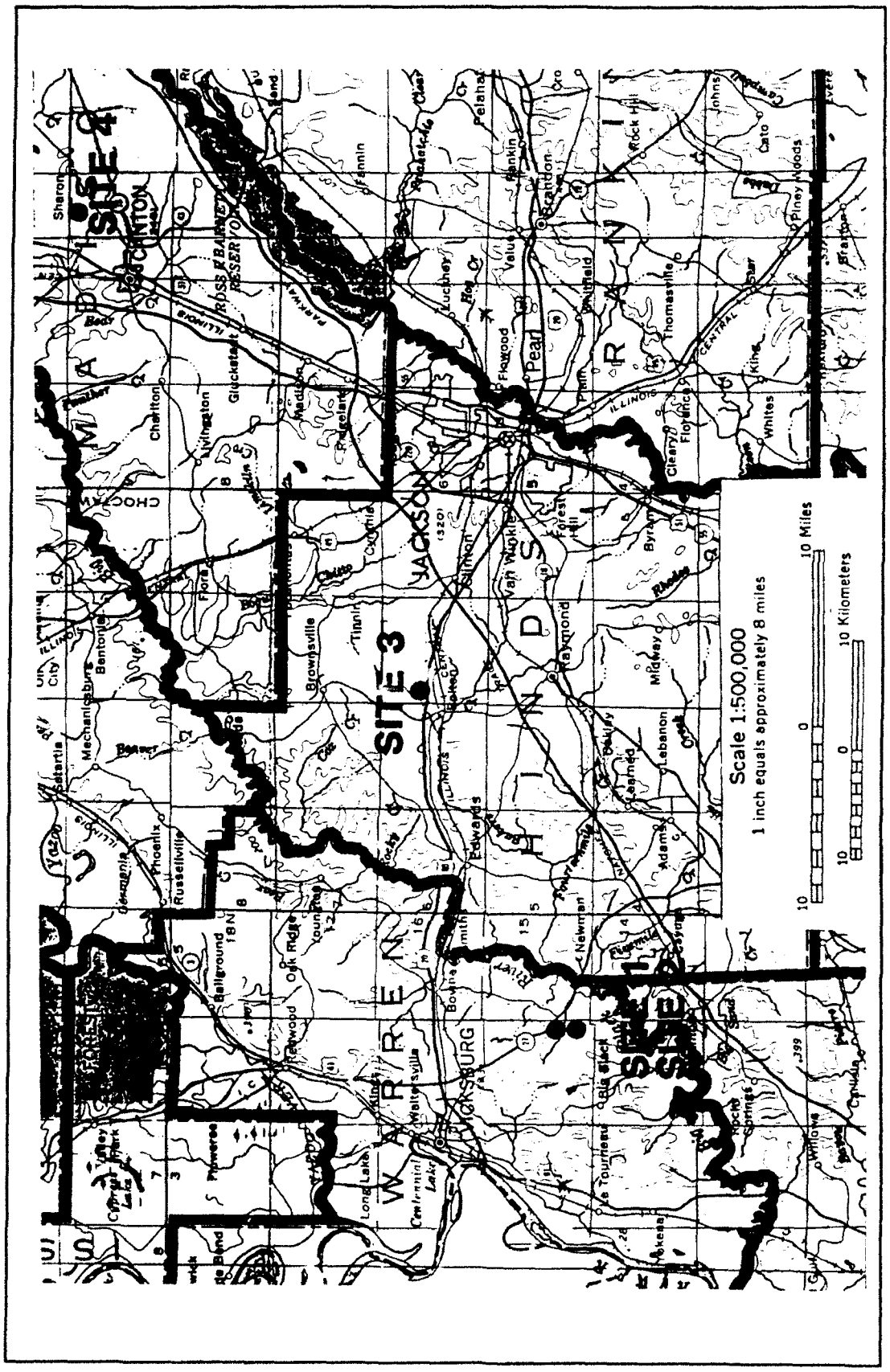


Figure 1. Location of ephemeral gully sites 1-4

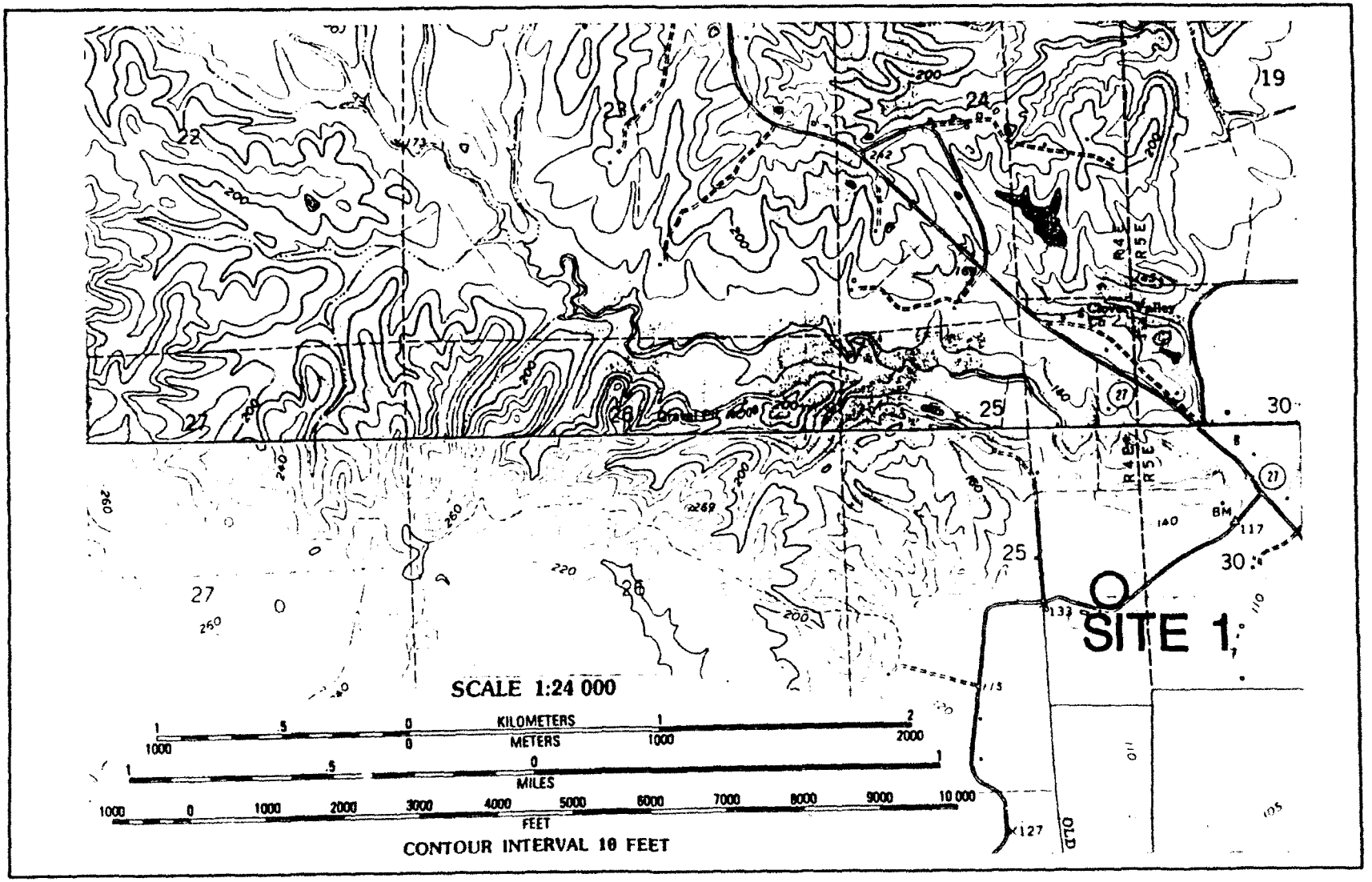


Figure 2. Site 1, Memphis soil

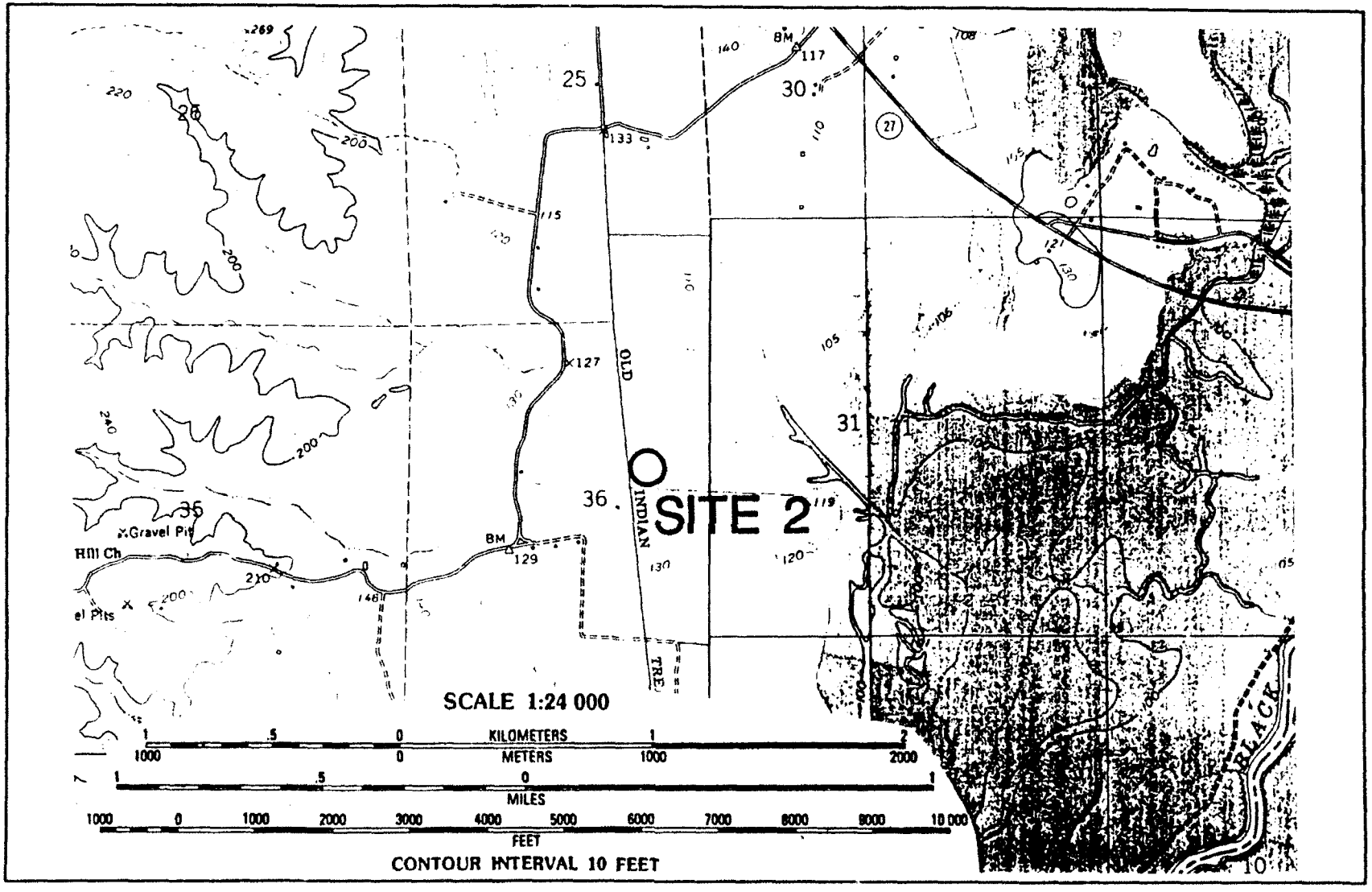


Figure 3. Site 2, Memphis soil

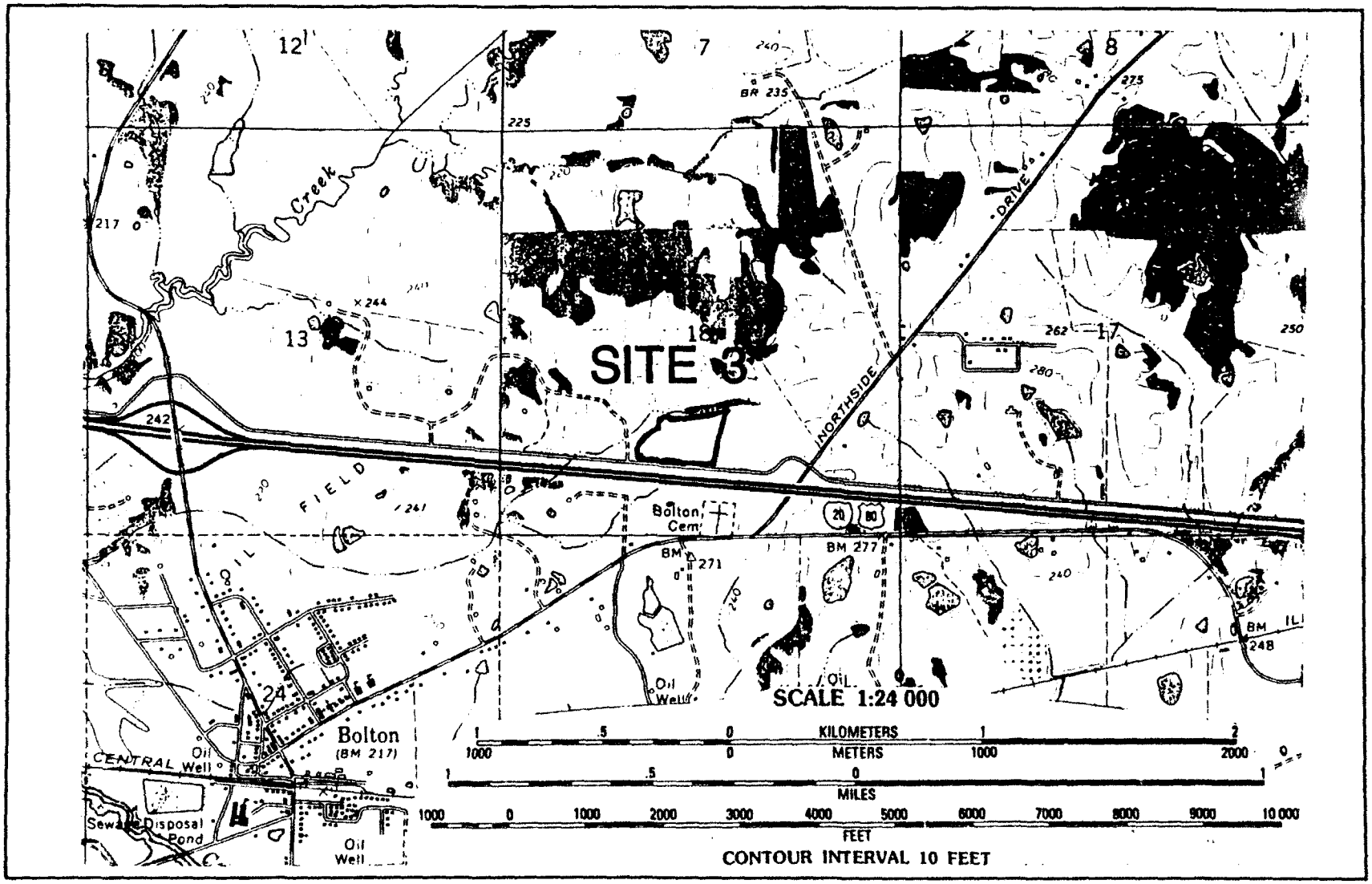


Figure 4. Site 3, Loring soil

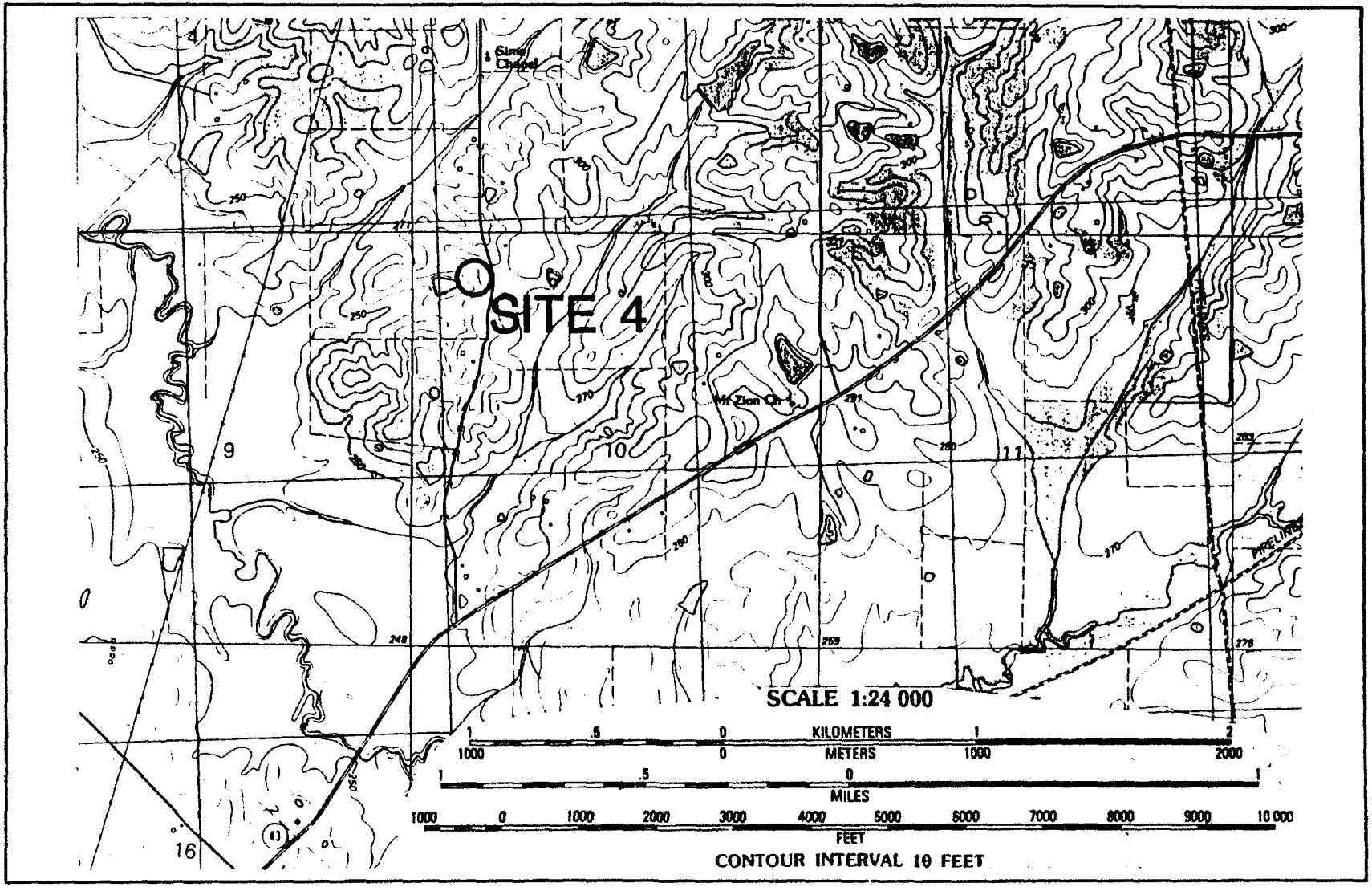


Figure 5. Site 4, Providence soil

Establishment of Sites

Upon the selection of the four sites in the three counties, site establishment proceeded in four steps:

a. The first step was to conduct a survey of the site using electronic distance measuring equipment. During this stage temporary bench marks were established at each site and data points were obtained at sufficient proximity to complete topographic maps of the site of the appropriate scale.

b. In the second step topographic maps were drafted for each site at a contour interval of 0.25 ft or 0.33 ft (Plates 1 through 15).

c. The third step involved the installation of the gully measurement stations. Upon selection of the appropriate gullies to map, that is, those which could be measured using the gulliometer gully measuring device, gully measurement stations were established along each gully. The gully measurement stations locations were selected to provide the optimum measurement of each gully (Figure 6). The gully measurement stations were changed each year because the measurement pins could not be left in the field during cultivation and planting with agricultural equipment. Each measurement cycle required a resurvey of the gully stations as they were changed each year.

d. The fourth step in the establishment of the sites included the installation of weather stations and rain gages to acquire precipitation and other meteorological data (Figures 7 and 8) and description of the soils (Figure 9). Mr. William A. Cole, SCS, described the soils. Mr. Cole's soil descriptions are presented in Appendix B.

Development of the Gulliometer

The measurement of ephemeral gullies on cropland requires the development of a procedure to accurately reconstruct both the length and cross sectional areas of the gullies. Review of developments in gully measurements suggested that a prototype instrument should be developed to measure gully cross sections. This device should be simple, durable, yet precise in reconstructing cross sections of gullies. A device was designed at WES, referred to as a gulliometer, which accomplished all of the goals of the gully measurement device. This gully measurement system consisted of a device which was set up over each gully measurement station for transferring to graph paper to ± 1 mm the cross sectional shape to full scale of the gully measurement station (Figures 10, 11, 12). The gulliometer was designed with leveling and registration capabilities to reconstruct the gully cross section at the same position upon repositioning over the pins at the sites during each measurement period. Drawings of the gulliometer are given in Appendix C. An assumption was

Figure 6. Installation of gully measurement stations, technicians using a piston hammer and a stadia rod level to drive the measurement pin into the ground

made that the pins, embedded to a depth of 24 in., did not move during the annual measurement cycle.

Field Measurement of Ephemeral Gullies

Ephemeral gullies were measured during the erosion cycle at all four sites. The first cycling included the spring of 1983 ending on 19 April 1983. A total of 14 gullies were measured in all four sites for a maximum of two gully measurement periods in the first cycle (Table 1). Cycle 2 extended from 2 May 1983 to 3 May 1984. Fourteen gullies were measured at the four sites over a maximum of six measurement dates (Table 2). Cycle 3 extended from 2 June 1984 to 29 April 1985. Ten gullies were measured during cycle 3 at sites 1, 2, and 4 (Table 3). No gully measurements were made at site 3 during cycle 3 because the site was plowed before the gullies could be measured. Three dates of measurement were included in cycle 3.

Ephemeral gully measurements began after harvest, typically in November, and were measured through the winter and spring period up until just before planting. Gullies were typically measured every 45 days or after a significant precipitation event. However, due to differences in agricultural practices and precipitation between the four sites, the number of measurement dates and

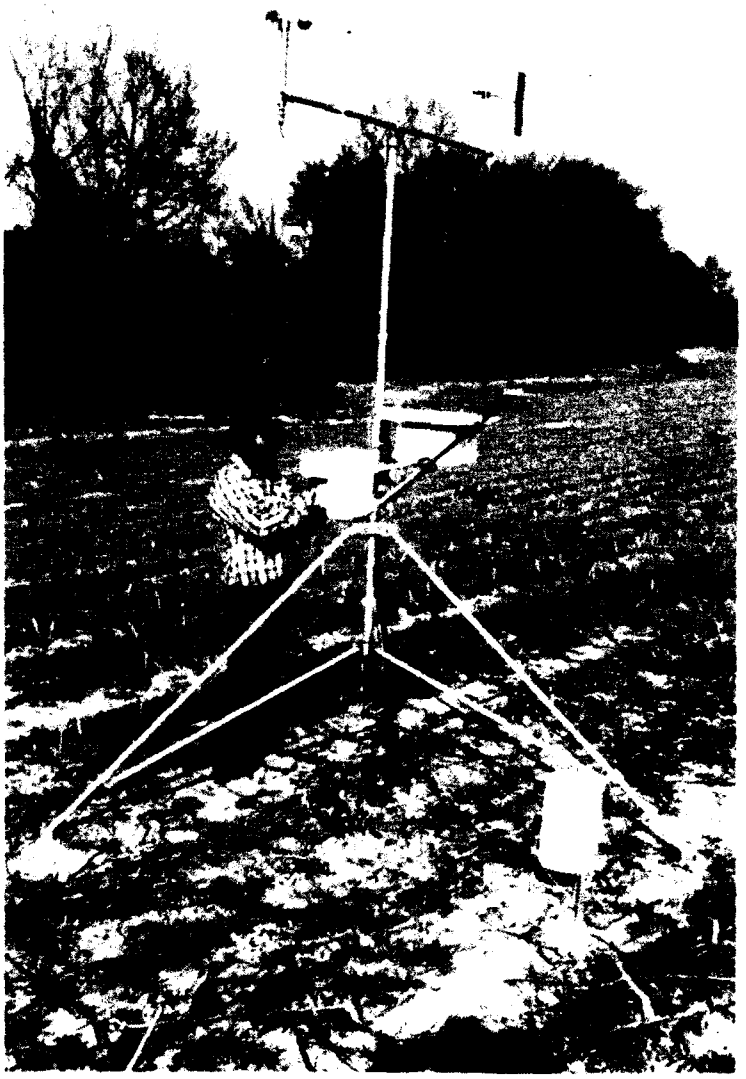


Figure 7. Installation of meteorological station, site 3

length of measurement cycles is highly variable between the sites. Using the gulliometer, the full scale cross sections of each gully station were recorded on a roll of graph paper 36 in. wide by 50 ft long. After the last reading for each gully for each cycle the gully length was measured. A total of

Figure 8. Installation of rain gage, site 2

1,350 gully cross sections were measured over the three cycles including 281 for cycle 1, 716 in cycle 2, and 353 in cycle 3.

At site 3 only, gullies were measured photogrammetrically from aerial photographs taken on 29 April 1985 and 13 January 1987. The photogrammetric measurement procedure is discussed in Appendix G.

Reduction of Gully Measurement Data

Upon reconstruction of the gully cross sections in the field, the cross sectional data were brought to the laboratory and digitized in the Tectronics microcomputer system (Figure 13). Using the digitized cross sections, the area, the width, the average width, maximum depth, average depth, wetted parameter, and hydraulic radius were calculated for each gully cross section. These data were stored in a computer data file for subsequent reexamination of the data at a later date. Gully volumes were calculated by integrating gully areas with gully length. Gully volumes were calculated by multiplying the length of the gully segment between measurement stations times the average area between the two measurement stations. Total gully volume for each gully is the sum of the volumes for all of the gully segments. Upon calculation of gully volumes, the weight of the soil voided from each gully was then calculated by multiplying 90 lb/cu ft times the volume in cubic feet of each

Figure 9. Soil description by Mr. William A. Cole, SCS

gully. The amount of soil loss due to ephemeral gullies is reported in tons/acre, representing tons of soil voided divided by the drainage area of each gully.

Figure 10. Gulliometer, site 3

Figure 11. Gulliometer in use, site 3

Figure 12. Gulliometer in use, site 1

Table 1
Cycle 1, Gully Measurements

Site-1		Site-2		Site-3[1]		Site-4	
Gully	Date	Gully	Date	Gully	Date	Gully	Date
A	03/10/83 04/18/83	A	03/12/83 04/20/83	A	03/08/83	A	03/21/83 04/19/83
B	03/10/83 04/18/83	B	03/12/83 04/20/83	B	03/08/83	B	03/21/83 04/19/83
C	03/10/83 04/18/83	C	03/12/83 04/20/83	C	03/08/83		
D	03/10/83 04/18/83			D	03/09/83		
				E	03/09/83		

[1] Only one measurement was made at site 3 because the field was plowed on 10 March 1983.

Table 2
Cycle 2, Gully Measurements

Site-1		Site-2		Site-3		Site-4	
Gully	Date	Gully	Date	Gully	Date	Gully	Date
A	10/05/83 02/02/84 03/23/84 04/05/84 04/25/84 05/03/84	A	01/20/84 03/23/84 04/05/84	A	02/03/84 03/21/84	A	01/05/84 02/03/84 03/16/84 04/06/84 04/27/84 05/08/84
B	10/05/83 02/02/84 03/23/84 04/05/84 04/25/84 05/03/84	B	02/02/84 03/23/84 04/05/84	B	02/03/84 03/21/84	B	01/05/84 02/03/84 03/16/84 04/06/84 04/27/84 05/08/84
C	10/05/83 02/02/84 03/23/84 04/05/84 04/25/84 05/03/84			C	02/03/84 03/21/84	C	01/05/84 02/03/84 03/16/84 04/06/84 04/27/84 05/08/84
D	10/05/83 02/02/84 03/23/84 04/05/84 04/25/84 05/03/84			D	02/03/84 03/21/84		
				E	02/03/84 03/21/84		

Table 3
Cycle 3, Gully Measurements

Site-1		Site-2		Site-3[1]		Site-4	
Gully	Date	Gully	Date	Gully	Date	Gully	Date
A	02/21/85 03/25/85 04/15/85	A	02/20/85 03/25/85 04/15/85			A	02/22/85 03/22/85 04/29/85
B	02/21/85 03/25/85 04/15/85	B	02/20/85 03/25/85 04/15/85			B	02/22/85 03/22/85 04/29/85
C	02/21/85 03/25/85 04/15/85	C	02/20/85 03/25/85 04/15/85			C	02/22/85 03/22/85 04/29/85
D	02/21/85 03/25/85 04/15/85						

[1] No measurements were made at site 3 during cycle 3 because of conflicting agricultural practices and measurement activities.

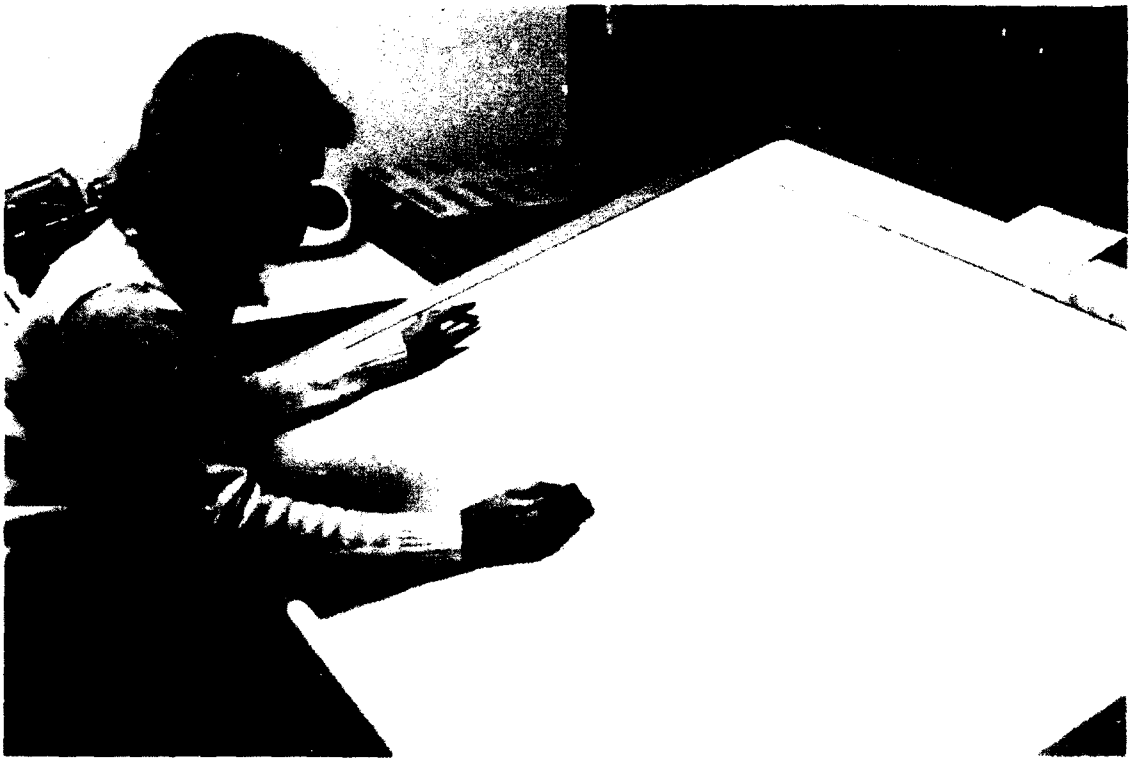


Figure 13. Digitizing gully cross sections

Acquisition of Meteorological Data

Meteorological data acquisition consisted of measurement of precipitation and several important meteorological parameters. Precipitation was measured by rain gages at sites 2 and 4. Weather stations were established at sites 1 and 3. Since precipitation was not measured during most of the first erosion cycle (which began in May or June, 1982) because the study had not begun, precipitation values were taken from the nearest official weather station for the period prier to precipitation measurement at the site dating back to the beginning of cycle-1. At the weather stations the parameters measured included soil temperature (degree centigrade) at -5 cm, soil temperature (degree centigrade) at -10 cm, incoming solar radiation in Langleys, air temperature (degree centigrade), humidity (percent relative), soil moisture (percent) at -5 cm, average wind direction (degrees), average wind speed (miles per hour) and precipitation (millimeters per hour). Due to difficulties in acquiring data from the electronic weather stations, the full meteorological data were only measured for 9 months at sites 1 and 3. Precipitation measurements, however, were taken throughout the entire gully measurement period and are given in Tables 4-13. The rainfall erosion index (R) was not calculated for each site. However, from Figure 1, the R values for each site were estimated (USDA 1978).

Photography of Field Sites

In conjunction with field measurements of gullies, each gully for each site for each cycle was also photographed in the field on several dates during each cycle. During the spring of 1983 and the first field measurement cycle, 35 mm color slides were taken for every station, every gully, every site, for every measurement period. During the subsequent cycles 2 and 3, periodic photographs were taken of each gully at each site. Aerial oblique photography was obtained of site 3 in 1983, 1985, 1986, and 1987 (Figure 14).

Photogrammetric Measurement of Site 3

During the initial field measurement of ephemeral gullies, Dr. Smith attended a status meeting of erosion studies conducted by the Agricultural Research Service at Oxford, Mississippi, in 1983. At this meeting, Dr. Smith became aware of the photogrammetric approach to gully measurement established by Welch (1983). Dr. Smith subsequently contacted Dr. Welch to discuss the application of photogrammetric methods to measurement of ephemeral gullies at the four sites in loessial soils in Mississippi. A contract was established with Dr. Welch in 1985 to conduct photogrammetric measurements of ephemeral gullies at site 3. In preparation for photogrammetric measurements, the size of site 3 was increased to approximately 12-1/2 acres to include various slope lengths, degrees, and aspects as well as row directions across slopes. Control points were established at site 3 prior to acquisition of

Table 4
Cumulative Precipitation During Cycle 1 at Sites 1 and 2 and Dates of Gully Measurement

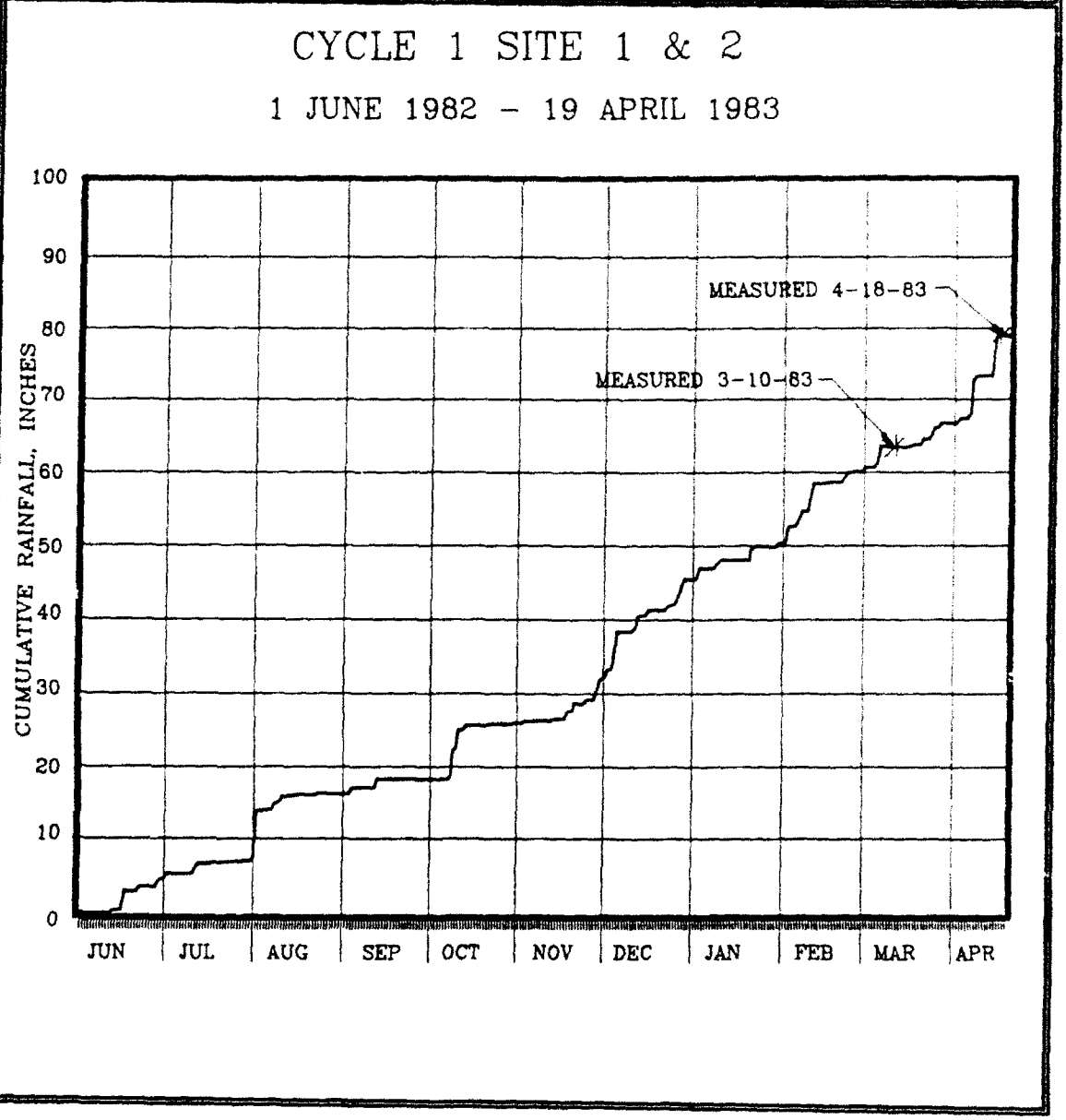


Table 5
Cumulative Precipitation During Cycle 1 at Site 3 and Date of Gully Measurement

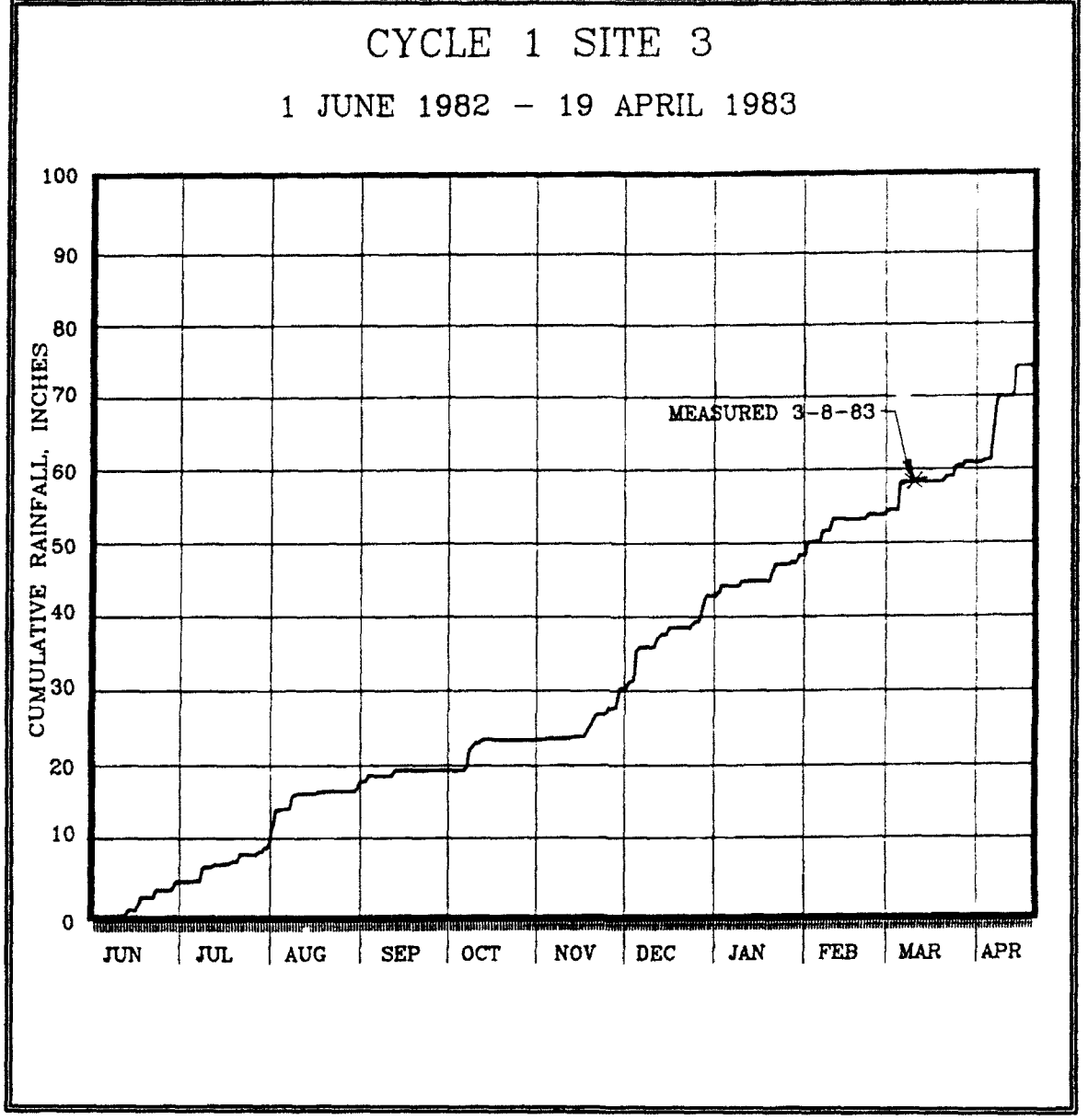


Table 6
Cumulative Precipitation During Cycle 1 at Site 4 and Dates of Gully Measurement

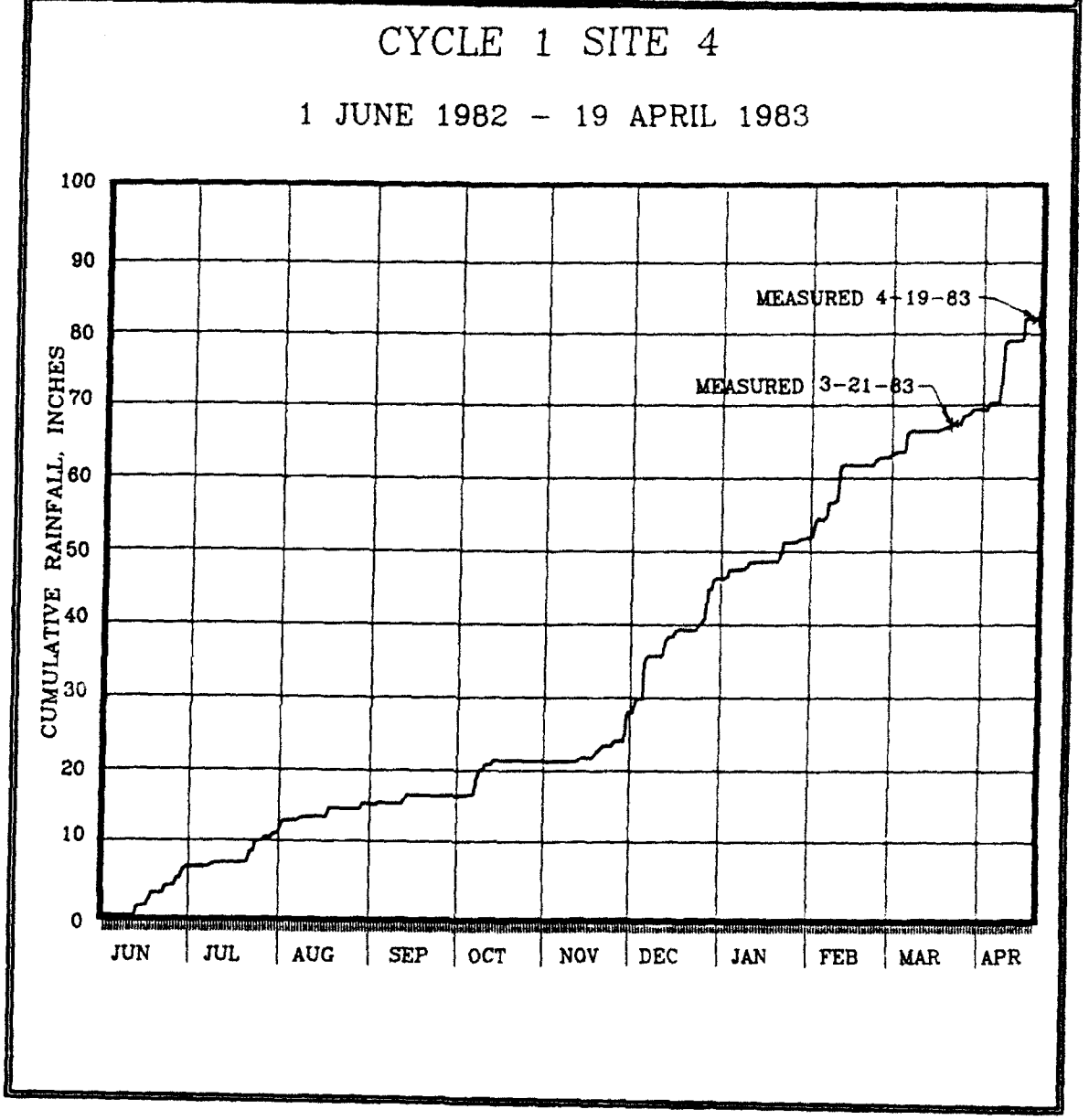


Table 7
Cumulative Precipitation During Cycle 2 at Sites 1 and 2 and Dates of Gully Measurement

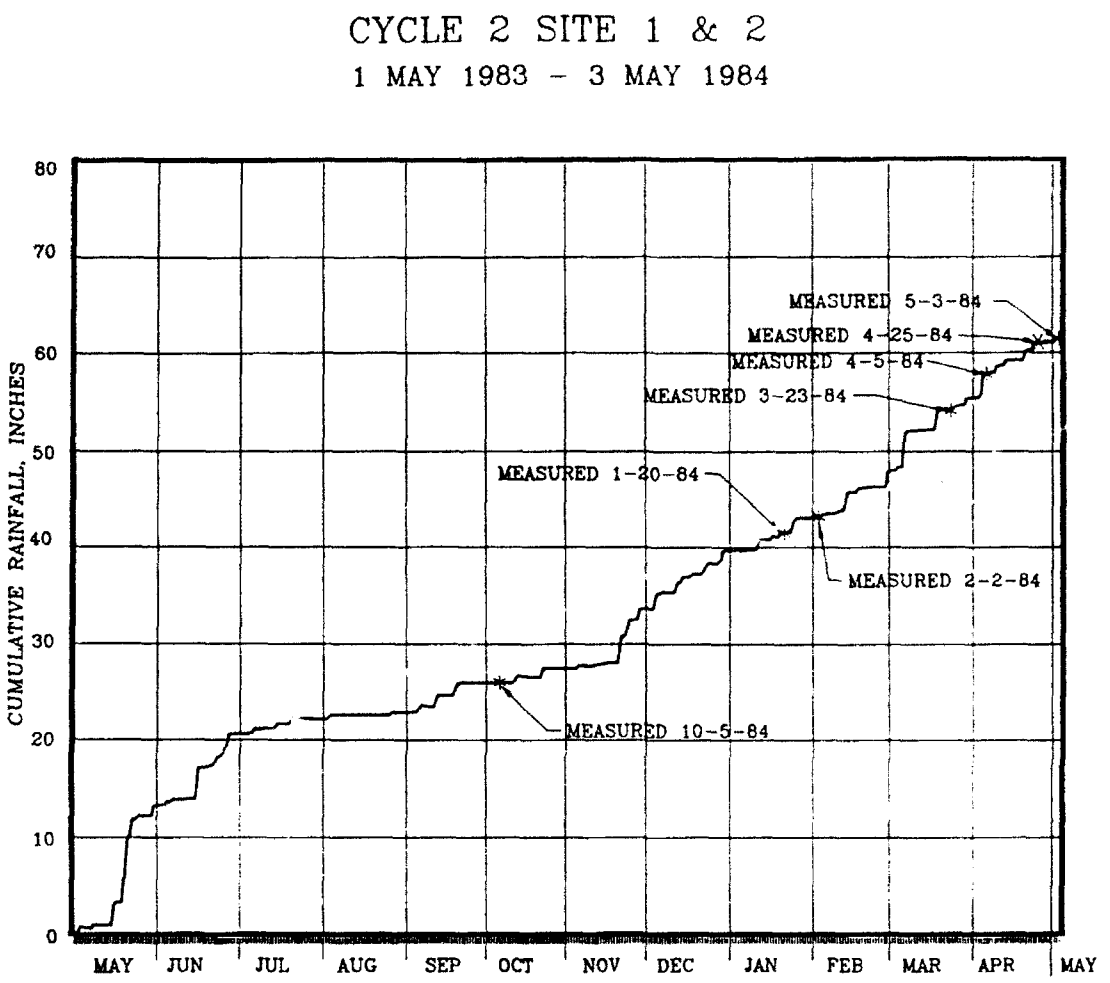


Table 8
Cumulative Precipitation During Cycle 2 at Site 3 and Dates of Gully Measurement

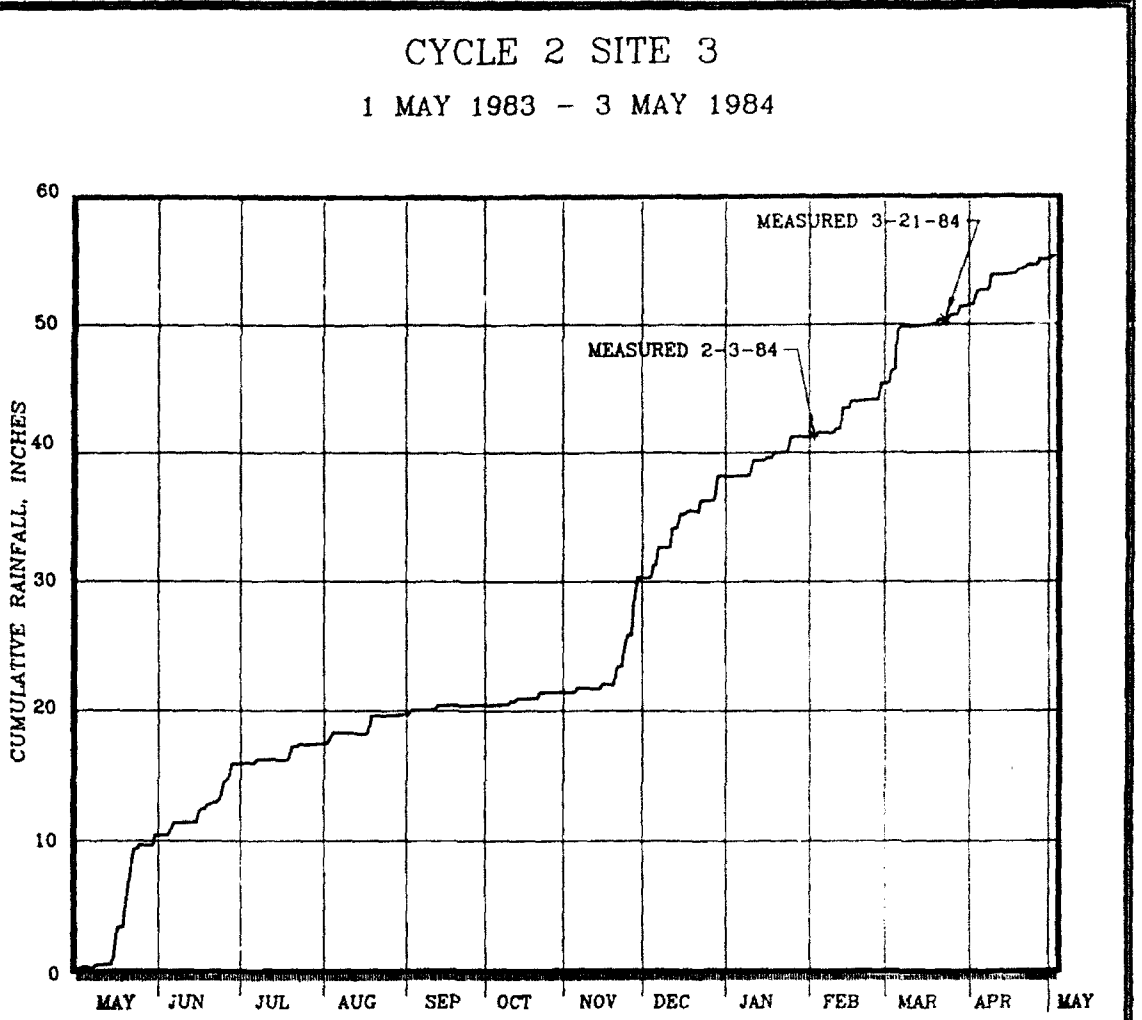


Table 9
Cumulative Precipitation During Cycle 2 at Site 4 and Dates of Gully Measurement

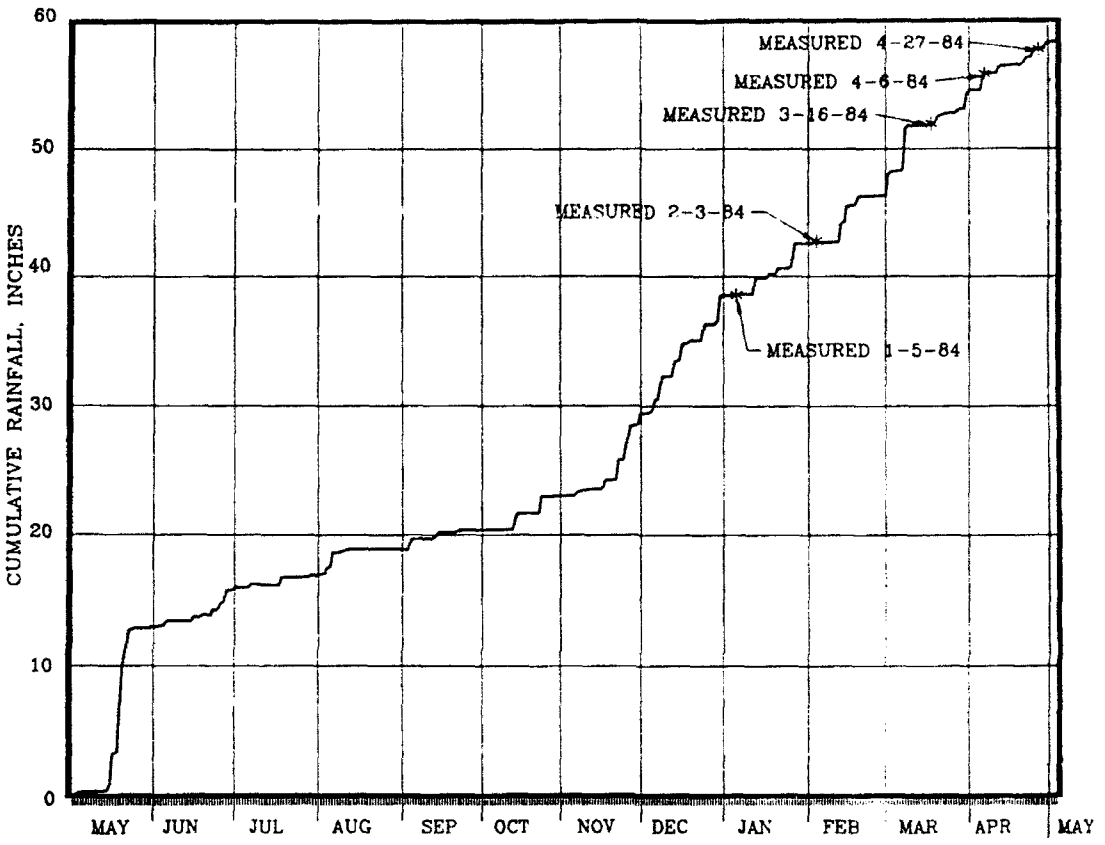


Table 10
Cumulative Precipitation During Cycle 3 at Sites 1 and 3 and Dates of Gully Measurement

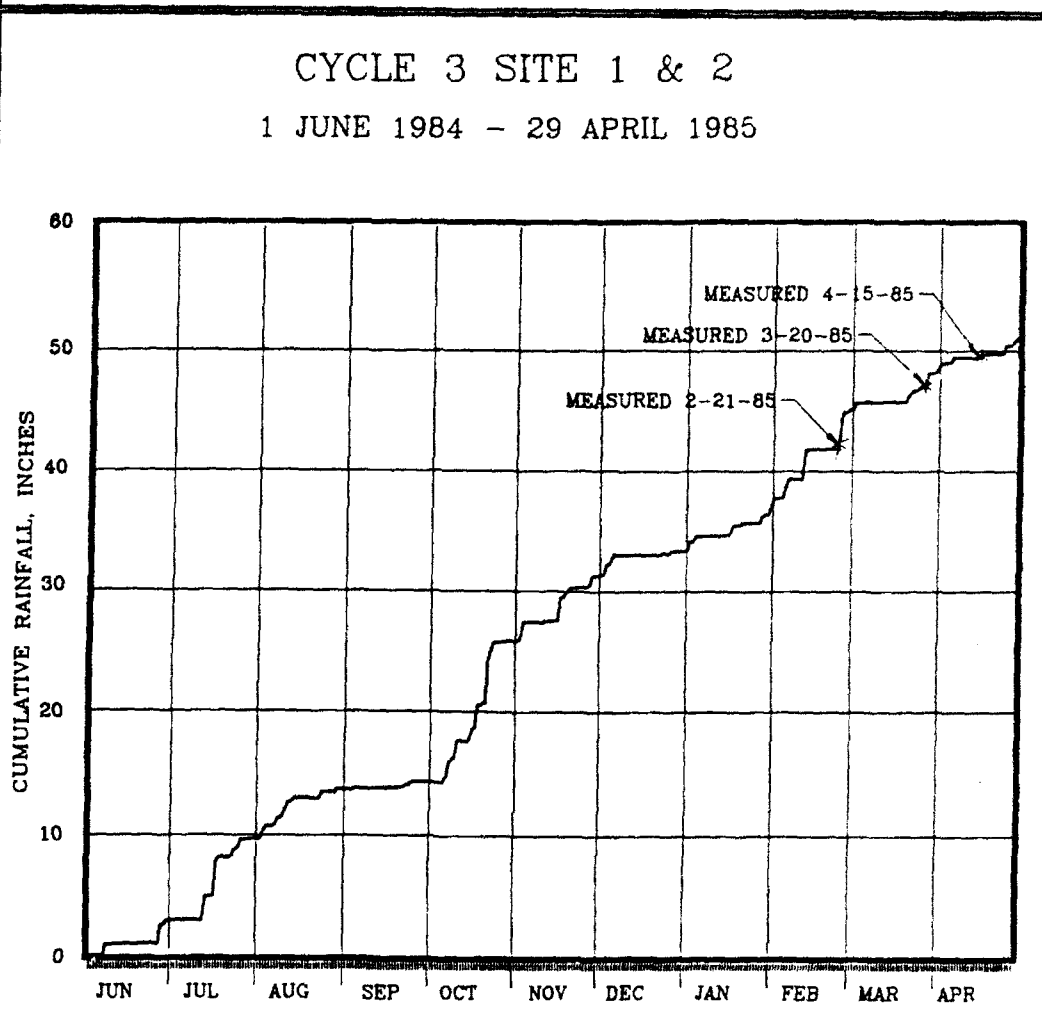


Table 11
Cumulative Precipitation During Cycle 3 Site 3

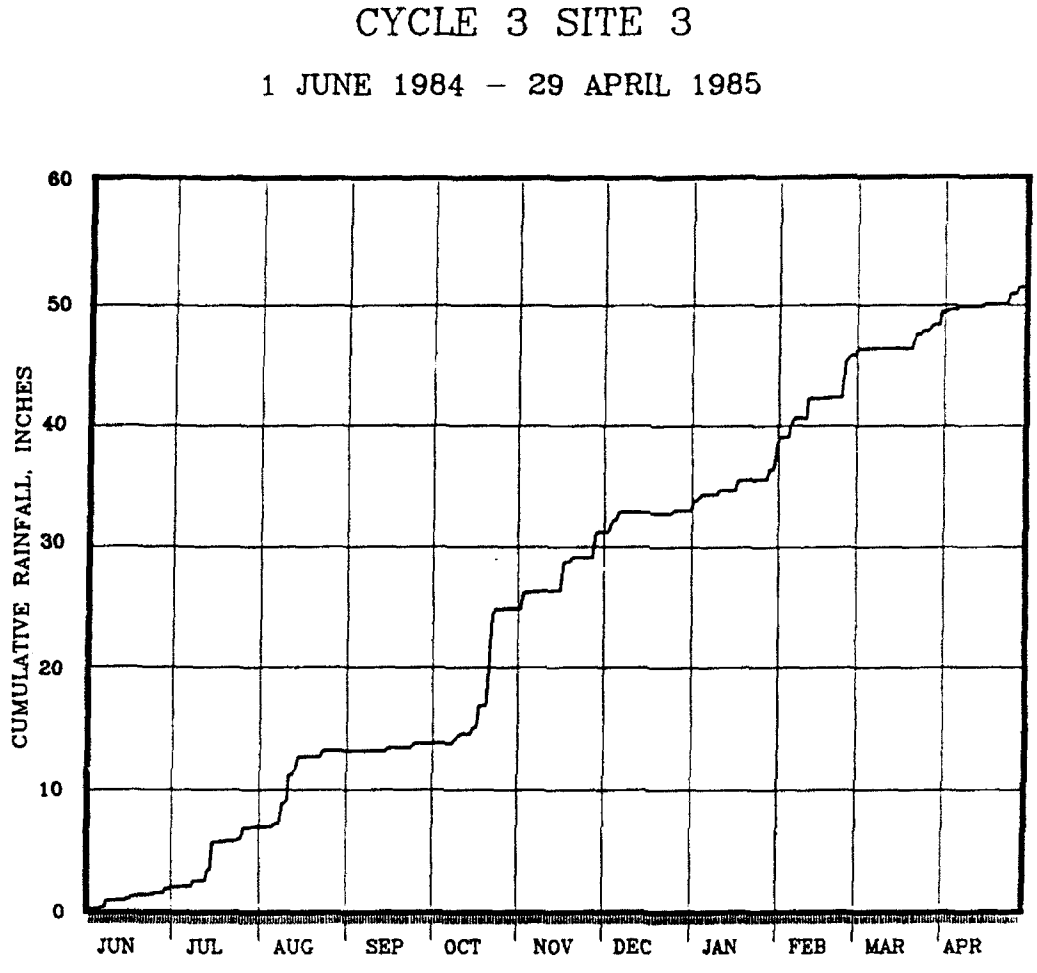


Table 12
Cumulative Precipitation During Cycle 3 at Site 4 and Dates of Gully Measurement

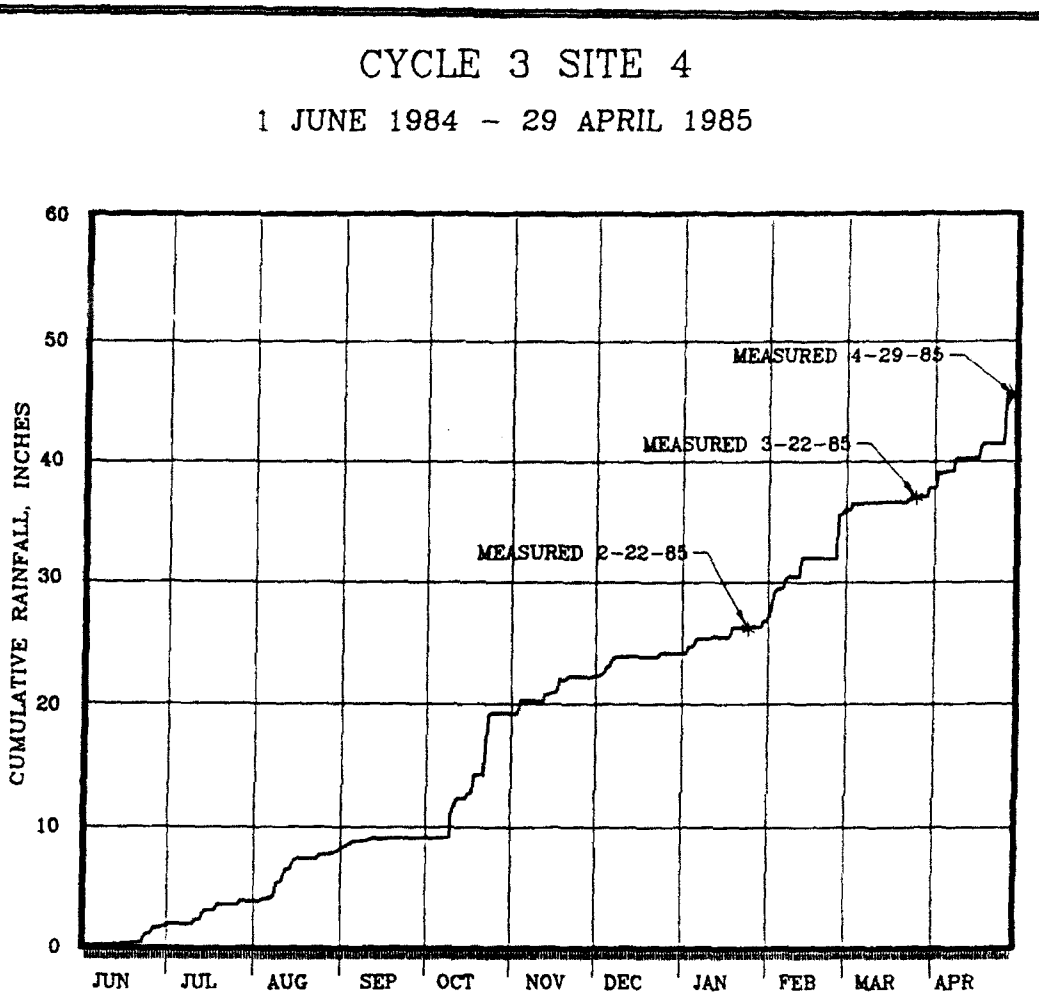
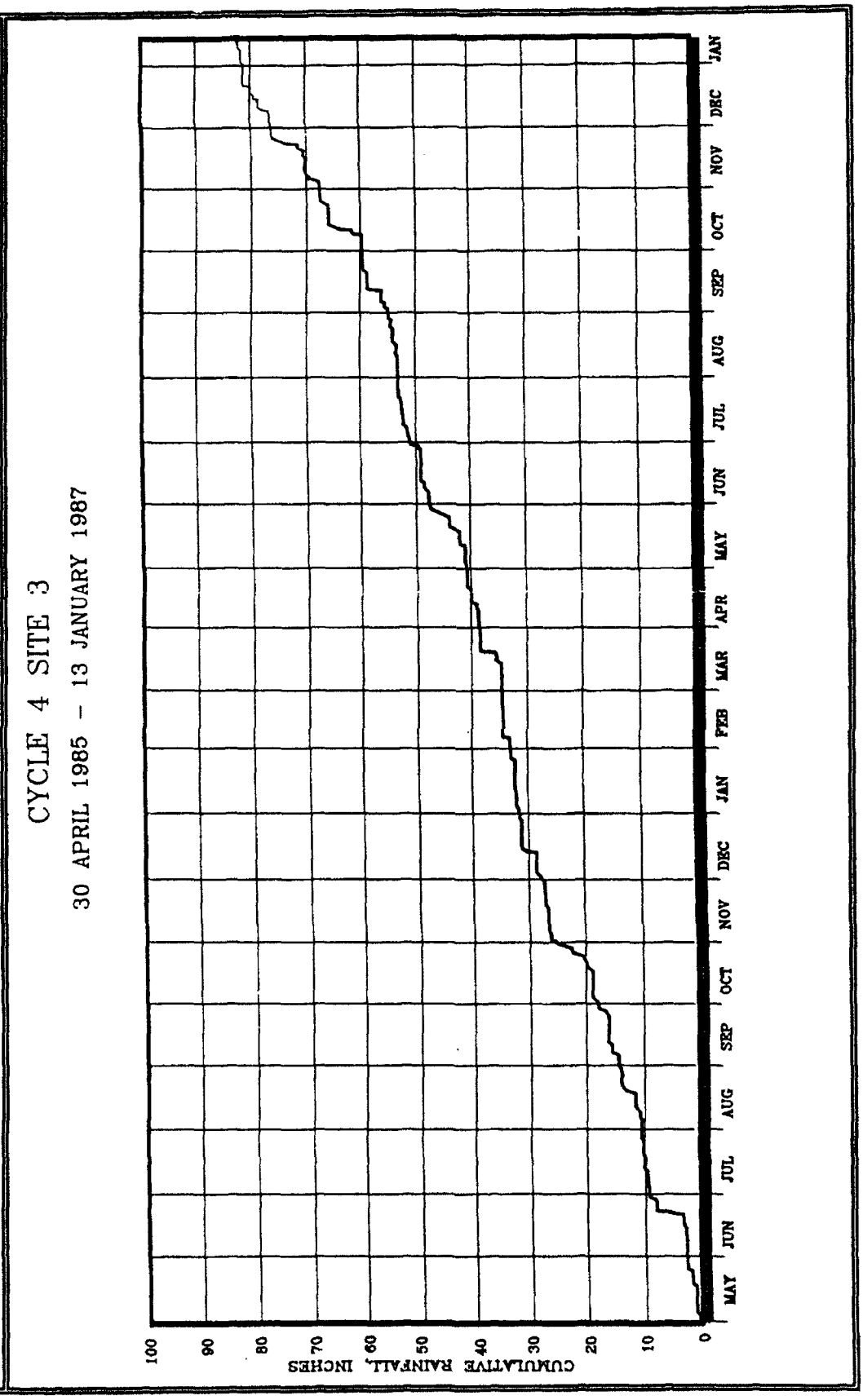


Table 13
Cumulative Precipitation During Cycle 4 at Site 3



aerial photography. Photogrammetric quality aerial photography was taken of site 3 on 4 May 1985 and 13 January 1987. Photogrammetrically derived topographic maps were constructed by Dr. Welch for both periods of aerial photographs. The volume of the gullies were estimated from the 13 January 1987 aerial photographs. Using the difference between the two topographic surveys, the amount of soil loss during the intervening period was calculated (Table 14) (Appendix G). Detailed topographic maps of site 3 for the two dates of aerial photography are given in Plates 16 and 17.

Figure 14. Aerial oblique photograph of site 3, 22 March 1984

Table 14
Photogrammetric Measurement of Gullies, Site 3

Gully Section	Length ft	Area sq ft	Width ft	Mean Depth ft	Volume Change cu ft
A	521.0	5.69	10.1	0.58	-2.081
A1	85.0	5.47	6.4	0.82	-3.500
A11	55.0	2.18	4.0	0.70	-3.500
A12	53.0	187.00	3.5	0.65	-31.000
A13	48.0	129.00	2.7	0.86	-40.000
A14	80.0	229.00	2.9	0.65	-114.000
A2	165.0	808.00	4.9	0.69	-344.000
A3	322.0	2,078.00	6.5	0.42	-736.000
A4	194.0	1,107.00	5.7	0.53	-330.000

Mean gully width = 6.9 ft.
Mean gully depth = 0.66 ft.
Total volume change = 4,067 cu ft.
Site size = 17.0 acres.

3 Observations

General Observations

Examination of the development of ephemeral gullies at the four sites over the three erosion measurement cycles indicated that there were several actual phases in the development of ephemeral gullies during a growing season. In general terms, these phases included plowing and planting in May, rainfall in June with the initial erosion of the ephemeral gully before the canopy of the crop emerges, development of crop canopy in July, and cultivation within the gullies filling them back in during August thru October as the crop matures. Gully erosion was somewhat arrested by the maturation of the crop with the exception of a small amount of soil being voided in the original gully location. After the crop was harvested in November, the gullies reestablished themselves. During the period of November through April, gully development occurred and maximum extension of the gully occurred by late April, prior to replowing and planting for the next crop. A good example of this multiple phase development of ephemeral gullies at a site was seen at gully A, at site 1. A series of photos of seven dates between 15 June 1983 and 26 March 1984 shows well the development of ephemeral gullies at site 1. On 15 June 1983, the field had just been plowed when a major precipitation event occurred, and gully 1A was just beginning to form (Figure 15). By 23 June 1983, the crop canopy had just begun to come out (Figure 16). Note also that the gully had continued to grow. In the intervening period between 23 June and 14 July, however, the field was cultivated and the small ephemeral gully at gully A was filled in by cultivation (Figure 17). On 29 September 1983, the crop had begun to mature (Figure 18). However, the area where the ephemeral gully occurred had caused a decrease in soil fertility and poor crop. By 25 November 1983, the crop had been harvested and the gully had been eradicated by plowing (Figure 19). The last photo of this sequence was taken 26 March 1984. The gully had reestablished itself at the same location prior to replanting in April of 1984 (Figure 20).

Examination of the development of the ephemeral gullies at the four sites over the three erosion cycles indicated that there apparently were critical slope lengths and slope gradients involved in the initial development of the ephemeral gullies at each site. These critical slope lengths and gradients appeared to be a product of not only the slope characteristics including slope aspect but the row direction of the crop as well. At those sites where the

Figure 15. Gully 1A, 15 June 1983

Figure 16. Gully 1A, 23 June 1983

Figure 17. Gully 1A, 14 July 1983

Figure 18. Gully 1A, 29 September 1983

Figure 19. Gully 1A, 25 November 1983

Figure 20. Gully 1A, 26 March 1984

rows ran directly downslope, each row became a gully. A good example of row-gullies is the western end of site 1 where the end of the rows had eroded as much as 8 to 10 in. (Figure 21). When the rows ran across the slope, there appeared to be a critical slope angle and slope length where the ephemeral gullies begin to break over the row tops. These row break-over points appeared to occur fairly high on the gully slope, and in no cases greater than one-third of the way down the slope side (Figure 22). The initiation of the ephemeral gullies at each site will be discussed in the paragraphs below on observations for each site.

Figure 21. Row gullies, site 1, April 1984

Additional site factors also influence the development of the ephemeral gullies. The principal parameter involved in selection of the sites was soil type. One of the purposes of selecting the ephemeral gully sites on three different types of soils was to investigate the significance of the depth to a fragipan actually occurring in the loessial soils on the development of the ephemeral gullies. As will be discussed under specific observations under each site below, the depth of the fragipan had a substantial effect on not only the development of the gully, but the resulting shape of the gully as well. Agricultural practices were, as one would expect, very important in the development of the ephemeral gullies at the sites. The principal agricultural practices of significance were row direction and timing of cultivation or fall plowing. A final site factor of substantial importance in development of gullies was the timing and total amount precipitation for each site. As will be shown in the paragraphs below, not only the amount of precipitation was

Figure 22. Row breakover by ephemeral gully, site 3, 8 March 1983

important, but the occurrence of the precipitation events during critical times in the erosional cycle was significant in determining how much soil loss would occur due to the development of ephemeral gullies at each site.

Observation of the ephemeral gullies developed on the four sites over three erosion cycles indicated that where the individual gullies reoccurred every

year in generally the same location, they did not occur in the same exact location every year. Their reoccurrence in the same general location was a function of the development of erosional hollows, large areas of gully development over many years of agricultural practices at the site. These erosional hollows are the loci for the development of ephemeral gullies year after year. Measurement of the volume of these erosional hollows would provide an estimate of the total amount of erosion due to ephemeral gullies at that site during the full period of agriculture use. Consequently, the significance of ephemeral gully erosion in terms of soil loss at a site may be indicated by the magnitude of the erosional hollows, which may be determined from detailed topographic maps at each site.

Annual soil loss was determined each site by SCS personnel using the Universal Soil Loss Equation (USLE). Erosion indices (R values) were also taken from Agricultural Handbook 537 (U.S. Department of Agriculture 1978). Calculation of EL values from rainfall data for each site were not made for this study.

Site 1 Observations

Site 1, in Warren County, Mississippi, consists of a shallow highly eroded soil of the Memphis series. The fragipan is shallow between 10 and 40 cm beneath the surface. The site sits on a terrace escarpment of the Big Black River. The uppermost part of the site is generally flat as is the lower toe of the site. The gullies develop in the erosional escarpment in the terrace (Figures 23-26). During all three gully measurement cycles, soybeans were grown at the site. Field observations indicate that the gullies begin just below the crest of the terrace escarpment and extend erosionally upslope and downslope during the development of the erosion cycle. As a result, extensive gullies erode in the terrace escarpment with depositional fans forming at the bottom of the slope. Soil loss estimations by the universal soil loss equation give values of 8.2, 13.2, and 13.2 tons/acre/year, respectively for 1983, 1984, and 1985. Calculated soil loss from the development of ephemeral gullies was 15.4, 5.9, and 4.3 tons/acre for erosional cycles 1, 2, and 3, respectively. Precipitation during the three erosional cycles were 79.07 in. for cycle 1, 63.48 in. for cycle 2, and 50.99 in. for cycle 3. The estimated erosion index for site 1 is 320. Consideration of the amount of soil loss due to sheet rill erosion indicated by the universal soil loss equation and the development of ephemeral gullies as documented by field measurements with respect to precipitation during erosional cycles indicates that sheet rill erosion does not appear to be related to the total amount of precipitation during the cycle. However, the development of ephemeral gullies is more closely related to the amount of precipitation per cycle. Maximum precipitation occurred in the first cycle which parallels the maximum development of ephemeral gullies. Minimum precipitation occurred during the third cycle as reflected in the minimum amount of ephemeral gully soil loss. The ephemeral gullies reoccur within several large hollows on the site. Gully 1A reoccurs in a large hollow established over many years at site 1.

Figure 23. Gully A, site 1, 10 March 1983

Figure 24. Gully B, site 1, 10 March 1983

Figure 25. Gully C, site 1, 10 March 1983

Figure 26. Gully D, site 1, 10 March 1983

Site 2 Observations

Site 2 is a typical Memphis silt loam soil with a fragipan between 30 and 50 cm beneath the surface. The site occurs on a long low slope adjacent to a terrace of the Big Black River bottom. Soybeans have been grown at site 2 during all three erosional cycles. Field observations indicate that the gullies began approximately one-half of the way down from the top slope and progress downslope as well as upslope during erosional development over the cycle (Figures 27 and 28). The gullies connect at the bottom of the slope and site to a field drainage ditch. Soil loss calculations by the USLE indicate 4.8, 4.0, and 4.0 tons/acre/year for cycles 1, 2, and 3, respectively. Ephemeral gully soil loss was measured at 9.5, 6.7, and 10.8 tons/acre for cycles 1, 2, and 3, respectively. Precipitation estimated or measured at site 2 was 79.07 in., 63.48 in., and 50.99 in. for cycles 1, 2, and 3. The estimated R factor is 390 for site 2. The relationship between sheet rill erosion as predicted by the USLE and precipitation is not strong. The relationship between soil loss due to ephemeral gullies and precipitation is also problematic. Maximum soil loss measured due to ephemeral gully development occurred during the third cycle which had the minimum precipitation. However, it appears that the development of ephemeral gullies is not directly related to total precipitation at site 2 but rather to the timing of individual precipitation events. Three gullies were measured at site 2 in generally the same location. Erosional hollows are generally not well defined at site 2. During field measurement it became apparent that crop residue was very important at site 2 in clogging the gullies and causing small dams which in turn resulted in sedimentation within the gully rather than erosion (Figure 28).

Site 3 Observations

Site 3 is a larger more complex site than the other three sites (Figure 29). The soils at site 3, originally of the Loring series, are highly eroded and modified. Several old house sites were documented at site 3 during initial establishment of the site and characterization of the soil. Subsoiling or plowing of the fragipan has also been extensive in site 3, as reflected in the geometry of the gullies. The depth to the fragipan is highly variable. Agricultural practices have been highly variable at site 3 as well. In 1983 cotton was grown in rows which extended from east to west. Corn was grown in 1984 during cycle 2 in rows parallel to the cotton rows of 1983. However, in 1985 the field was left fallow.

Site 3 is an upland site consisting of a well developed hill crest, hill side, and dendritic drainage network at the base. The gullies reoccur generally in the same location, although well developed erosional hollows do not exist for the smaller gullies. Gully A occurs in a similar position each year, as does gully B occurring in a large erosional hollow (Figures 30 and 31). Gully C also occurs in a hollow in the same general position as does gully E (Figures 32 and 33). However, gully D measured in 1984 did not occur in 1983

Figure 27. Gully A, site 2, 12 March 1983

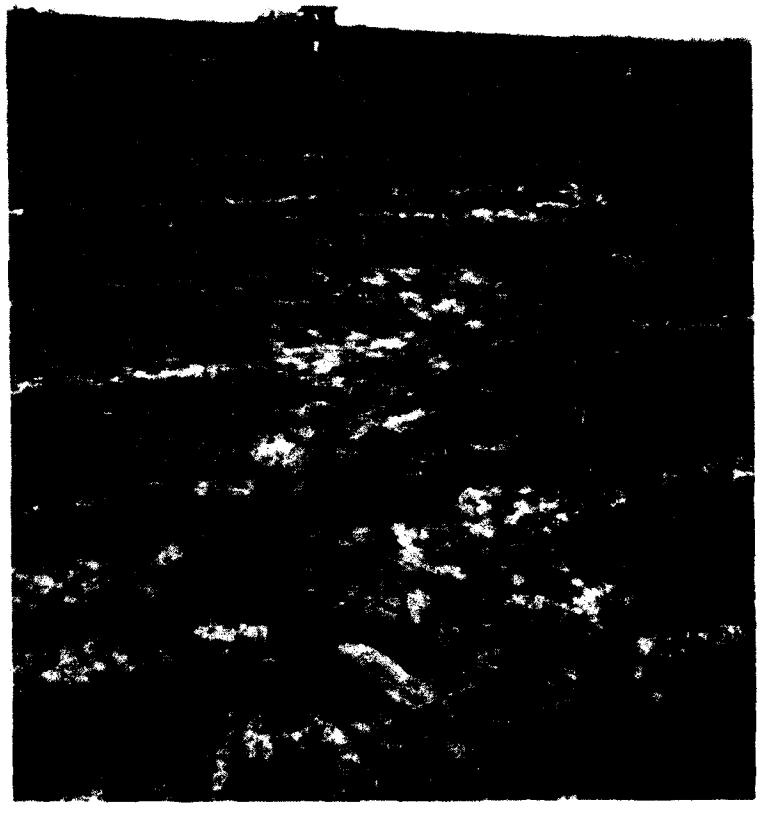


Figure 28. Gully B, site 2, 12 March 1983

Figure 29. Site 3, 8 March 1983

(Figure 34). Field observations indicate that gullies generally began approximately one-third of the way down the slope from the slope top. The gullies then extend themselves both upslope and downslope. Fans deposited at the toe of the gully were observed in the field for each cycle. Soil loss estimated by USLE was 32 tons/acre/year for 1983 and 45.7 tons/acre/year in 1984, the two highest levels of soil loss estimated by the USLE for the four sites. Soil loss due to the development of ephemeral gullies was considerably less, measured at 8.3 tons/acre for cycle 1 and 5.6 tons/acre for cycle 2. Precipitation at site 3 was estimated as 74.84 in. for cycle 1 in 1982-1983 and measured at 57.61 in. for cycle 2 in 1983-1984. The R factor estimated for site 3 is 380. The total amount of soil loss due to the development of sheet and rills (estimated by the USLE) does not appear to be related to the total amount of precipitation. However, the development of ephemeral gullies is more closely related to precipitation with maximum soil loss due to ephemeral gullies occurring during maximum precipitation. Like site 2, crop residues, specifically cornstalks, are important in clogging and causing sedimentation within a gully and decreasing the amount of soil loss due to the development of the gullies. Clogging of gullies with crop residue is particularly important when the rows run directly downslope, which occurs on the west end of site 3. Crop residue appears to be very effective in clogging rows which have become ephemeral gullies and retaining soil on the field.

Figure 30. Gully A, site 3, 8 March 1983, looking down slope

Figure 31. Gully B, site 3, 8 March 1983, looking up slope

Figure 32. Gully C, site 3, 8 March 1983, looking up slope

Figure 33. Gully E, site 3, 8 March 1983, looking up slope

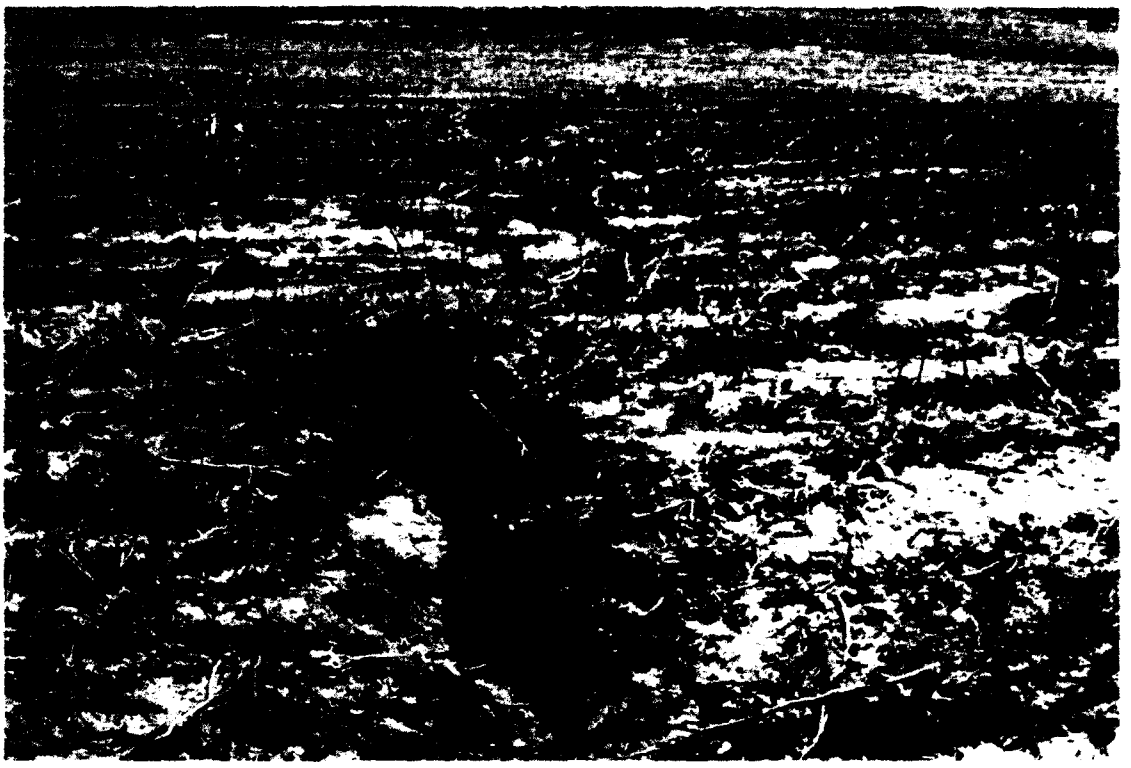


Figure 34. Gully D, site 3, 21 March 1984, looking down slope

Site 4 Observations

Site 4 is a relatively small simple site in an upland position in Madison County (Figures 35 and 36). The surface soil is Providence series with a shallow fragipan varying in depth from 10 to 25 cm. Substantial erosion has occurred at the site over the years, as indicated by the general lack of the upper soil horizons. Agricultural practices during the 3 yr of gully erosion measurement were all the same and were soybeans drilled with winter rye established. The winter rye grass was periodically grazed by cattle. The gullies reoccurred every year in a single large hollow. The gullies apparently begin approximately one-half of the way downslope and extend both down and upslope. A large fan occurs at the bottom of the major gully at site 4 (Figure 37). This fan of soil deposition is progressing downslope into a small farm pond and rapidly filling the pond with sediment. The headward extension of the gullies at site 3 reflects the headward development of a dendritic drainage network. Soil loss, as estimated by the USLE, was 23 tons/acre/year for each of the three cycles of erosion. Measurement of soil loss due to the development of ephemeral gullies was 6.7, 5.8, and 3.6 tons/acre for cycles 1 through 3, respectively. Precipitation at site 4 was estimated as 82.19 in. in 1983, and measured at 59.79 in. in 1984, and 45.69 in. in cycle 3 in 1985. The R factor for site 4 is estimated at 370. Total amount of precipitation appears to be more related to the development of ephemeral gullies rather than

Figure 35. Site 4, December 1983, looking down slope

Figure 36. Site 4, 21 March 1983, looking up slope

Figure 37. Fan at the toe of Gully A, site 4, 16 March 1984

soil loss due to sheet rill erosions. As in sites 2 and 3, the residue of the previous soybean crop appeared to be important in clogging gullies and causing sedimentation and decreasing the amount of total soil loss from the field.

4 Results

Development of Ephemeral Gully Data

During the 3 yr of measurement of ephemeral gullies at the four sites, a total of 38 gullies were measured on 11 different measurement dates. This resulted in 281 gully measurements made in cycle 1, 716 gully measurements made in cycle 2, and 353 gully measurements made in cycle 3 for a total of 1,350 gully measurements made during the entire investigation over 3 yr. For each of these gully measurements, seven parameters were calculated including gully area, average gully width, maximum gully width, average gully depth, maximum gully depth, wetted perimeter, and hydraulic radius. These data are stored in a d-Base-3 file and are presented in Appendix D.

Magnitude of Soil Loss from Ephemeral Gully Data

Measurement of the development of ephemeral gullies at the four sites over the 3 yr, documents the fact that soil loss from ephemeral gullies is significant in many areas of cropland, certainly in the loessial soils of Mississippi. As a matter of fact, in some sites for some years, soil loss from ephemeral gullies was greater than soil loss estimated by sheet rill erosion using the USLE. In 1983 at site 1, almost twice as much soil was lost off the site from the development of ephemeral gullies as was loss by sheet rill erosion. However, in 1984, as in 1985, the amount of soil loss due to ephemeral gullies was considerably less than as was estimated by the USLE.

Comparison of soil loss due to sheet rill erosion and estimated by the USLE to the amount of soil loss measured by the development of ephemeral gullies suggests that these two types of soil loss are considerably different in occurrence, both in time and in space. The relative significance of site factors including slope length, slope degree, slope aspect, soil type, precipitation, and agricultural practices in producing soil erosion from sheet rill and ephemeral gullies appears to be highly variable. The variability of soil loss determined for each one of these sites for each cycle indicates that a method for predicting soil loss due to the development of ephemeral gullies is critical in the estimation of the total amount of soil loss from a site each year due to all processes.

Preliminary Analysis of Data

In the previous paragraphs, the development of ephemeral gullies for each site was presented. Additionally, an example of the seasonal development of ephemeral gullies was presented for gully A at site 1 for 1983. In examining the data for the periodic development of ephemeral gullies during each erosional cycle, it becomes apparent that the gullies go through periods of erosion and deposition within one erosional cycle. During cycle 2, from November 1983 until May 1984, six measurements were made of the ephemeral gullies at sites 1 and 4. Examination of the erosional development of the ephemeral gullies during these six dates of measurement shows that the gullies expand to some level of erosional development and then may experience several periods of deposition before the end of the erosional cycle in late April. The episodic erosional and depositional development of these ephemeral gullies is illustrated in the statistics on the volume of the gullies for sites 1-4 during cycle 2 (Appendix E). Graphs of the volumetric development of the ephemeral gullies through each cycle are given in Appendix F. For instance at site 4, gully development continued to expand through 6 April 1984 until remeasurement on 27 April 1984 indicated that sedimentation had occurred in gullies A and B (Appendix E, page E-8). Remeasurement of the gullies on 8 May showed that the sedimentation that occurred within the ephemeral gullies A and B at site 4 had been eroded again and maximum volume of gullies were developed at that time. In general terms, the gullies increased in size from their initial development in June to the following May at the end of the erosional cycle. However, as the data show, there were several periods of deposition that might occur within the gully during the erosional cycle.

Ephemeral Gully Erosion Equation

Thorne (1984) developed an ephemeral gully erosion equation (EGEE) to be used in conjunction with the USLE to predict the total amount of soil erosion from arable fields. The EGEE is, like the USLE, an empirically derived equation which predicts soil loss as a function of a number of site variables. The principal site variable is the "compound topographic index" (CTI) defined as:

$$CTI = \left[\frac{a}{s}\ Planc\right]$$

where

a = upslope contributing area

s = local slope gradient

$Planc$ = planform convexity index

The CTI is used as the variable to describe the areas where ephemeral gullies are likely to form in fields (areas of concentrated runoff). According to Thorne (1984):

> "The CTI accounts firstly for the contributing area upslope of the point in question, which is a good measure of the volume of runoff. Secondly, it includes the local gradient, s , which represents the intensity of runoff. Thirdly, it includes the planform concavity of the local contours, which represents the degree of convergence of the surface runoff. These are the factors identified as being critical to ephemeral gullying..."

The EGEE is applied by developing a map of CTI values for the field and delineating those areas of the field that will undergo erosion by ephemeral gullies. Soil erosion from the areas of the field outside of the gully-prone areas is estimated by the USLE. The EGEE is stated as:

$$E = constant\,[F_t K_r (CTI - CTI_{CRIT}) C_r P_r]$$

where

E = ephemeral gully erosion

K_r = soil erodibility for runoff erosion

F_t = runoff erosivity

$$CTI_{CRIT} = \text{function} \left\{ \frac{F_t}{K_r} \right\}$$

C_r = cropping factor for rill erosion

P_r = conservation practice for rill erosion

5 Conclusions

The determination of soil loss due to the erosional development of ephemeral gullies from crop land requires a number of measurements in order to accurately estimate the total amount of soil loss. These measurements include accurate reconstructions of gully shape, gully volume, and gully length. These measurements should be obtained several times during the erosional cycle. Data developed in this study show that the gullies not only experience progressive erosional development but may also exhibit several periods of deposition within the gully cross sections during the erosional cycle. These periods of deposition are probably related to the episodic growth of the gullies as well as to the contribution of crop residue into the gully and formation of small dams for sedimentation.

In the development of ephemeral gully data in the field, several measurement methods exist which give varying degrees of accuracy and value of data. This particular investigation involved the development of a device for accurate measurement of gully cross sectional area and shape. Accurate gully area length and gully location measurement were achieved at a high degree of accuracy with the gulliometer and surveying equipment. A second method of measurement of gullies is the photogrammetric measurement of gullies using low altitude aerial photography. The photogrammetric measurement of gullies at site 3 cost approximately $25,000. Whereas photogrammetric measurement of gullies provides for the rapid measurement of larger areas, the measurement of gullies smaller than approximately 2 ft in width and 1/2 ft in depth is practically unattainable. A third method, which was not used in this study, would consist of rapid acquisition of ephemeral gully dimensions by measurement of length and average width and depth in the field. This rapid estimation could be obtained with nothing more than steel tape in the field. However, the degree of accuracy of these measurements is much less than that of the gulliometer or photogrammetric analyses.

Some consideration of data acquisition should also be given to the nature of the site where the gullies are being measured. Research sites require not only the measurement of the gullies but the measurement of soil properties and meteorological conditions. Calibration sites require measurement of gully length and accurate measurement of gully volume. The normal estimation of soil loss due to the development of ephemeral gullies may be typically conducted by measuring gully length and estimating average gully depth and width in the field with a tape.

In this investigation of the erosional development of ephemeral gullies at four sites in loessial soils West Central Mississippi, the erosional development of 38 gullies was precisely measured over a period of 3 years. Methods developed in this study to accurately reconstruct the volume as well as the length of these ephemeral gullies should be applicable to other types of investigations gullies in other areas. Included in this report are all of the measurements and calculations of areas, volumes, widths, depths for each of the 1,350 measurement stations measured over 3 years.

These data may be used in the development of predictive techniques for ephemeral gullies that require gully volume as well as other topographic characteristics of the site. Although these data will be valuable to the development of predictive techniques for ephemeral gullies, it must be understood that there was probable soil loss due to the development gullies which was not measured at each of these sites. This unmeasured soil loss occurred during the growing season of the crop planted at each site each year. The erosional development of ephemeral gullies during the period of initial planting of the crop through harvesting of the crop was not measured. The amount of soil loss that occurs through the development of ephemeral gullies during this period is probably significant, although probably less than 25 percent of total soil loss due to the development of ephemeral gullies as measured at the end of the erosional cycle, typically in April or May. In order to measure total soil loss due the development of ephemeral gullies, a system would have to be developed which measured not only the soil loss indicated by this study but also the development of ephemeral gullies during the growing season for the crop.

6 Recommendations

Three methods for the measurement of ephemeral gullies in croplands have been identified by this study:

a. The use of the gulliometer, as documented by this investigation.

b. The photogrammetric measurement of the gullies also described by this investigation.

c. Rapid measurement of ephemeral gullies may be accomplished through the use of a tape to measure gully length and average width and depth.

The three methods of gully measurement should be used in different kinds of studies. For the development of calibration sites, detailed gully measurements are necessary. The use of the gulliometer provides detailed measurement of ephemeral gullies. The gulliometer is available for use upon request for the acquisition of ephemeral gully measurements at any site. Photogrammetric measurement of gullies should be completed on those sites which are extensive and have large gullies developed in them. Photogrammetric measurement of gullies is not inexpensive, however, this method does provide relatively accurate measurement of gullies larger than can be measured with the gulliometer. Rapid estimation of the amount of soil loss due to the development of ephemeral gullies can be accomplished simply by measuring the major dimensions of the gullies in the field with a tape. This rapid method of ephemeral gully estimation is one that should be used in most rough calculations of soil loss until such time that an accurate method of predicting soil loss to ephemeral gullies is developed.

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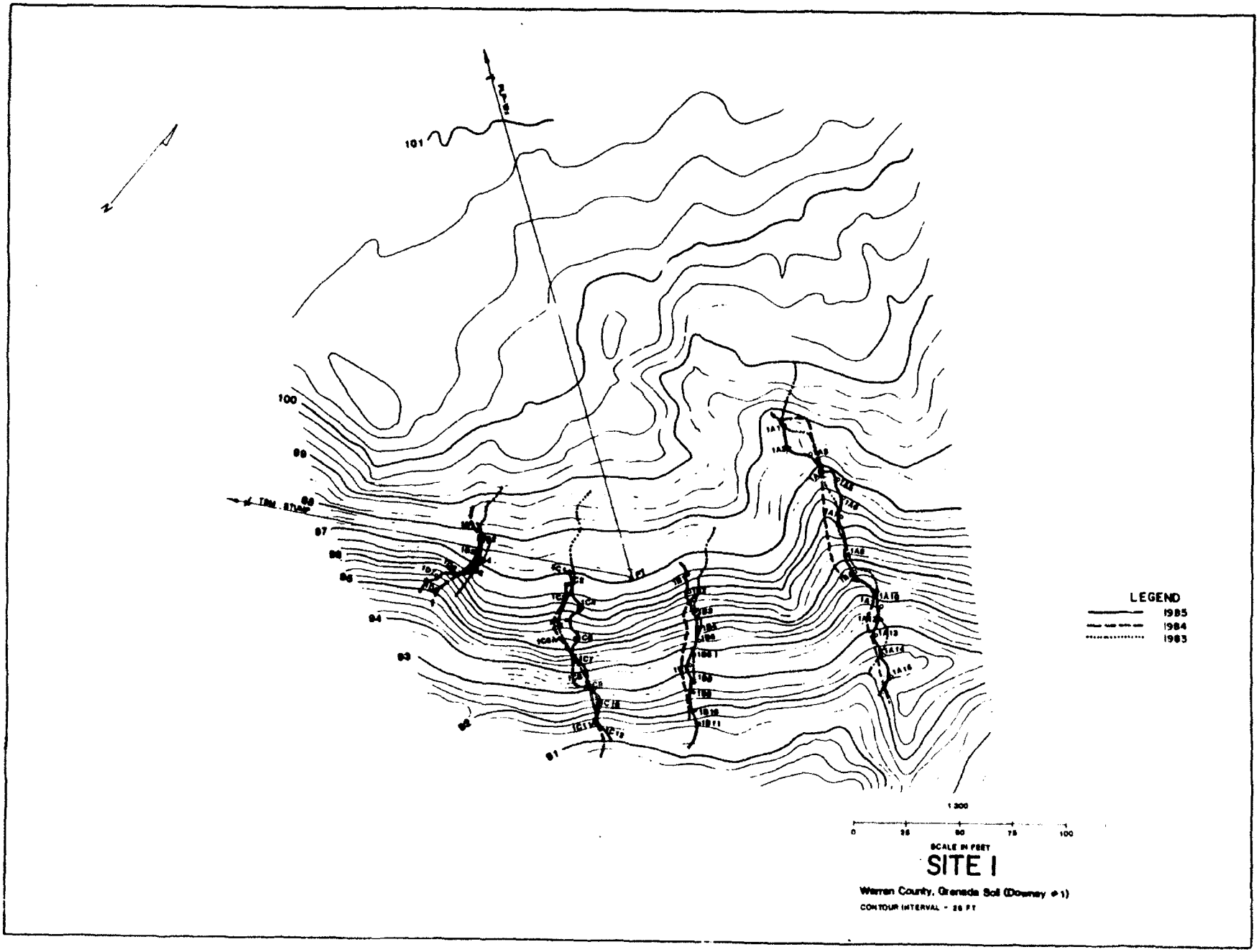
N
101
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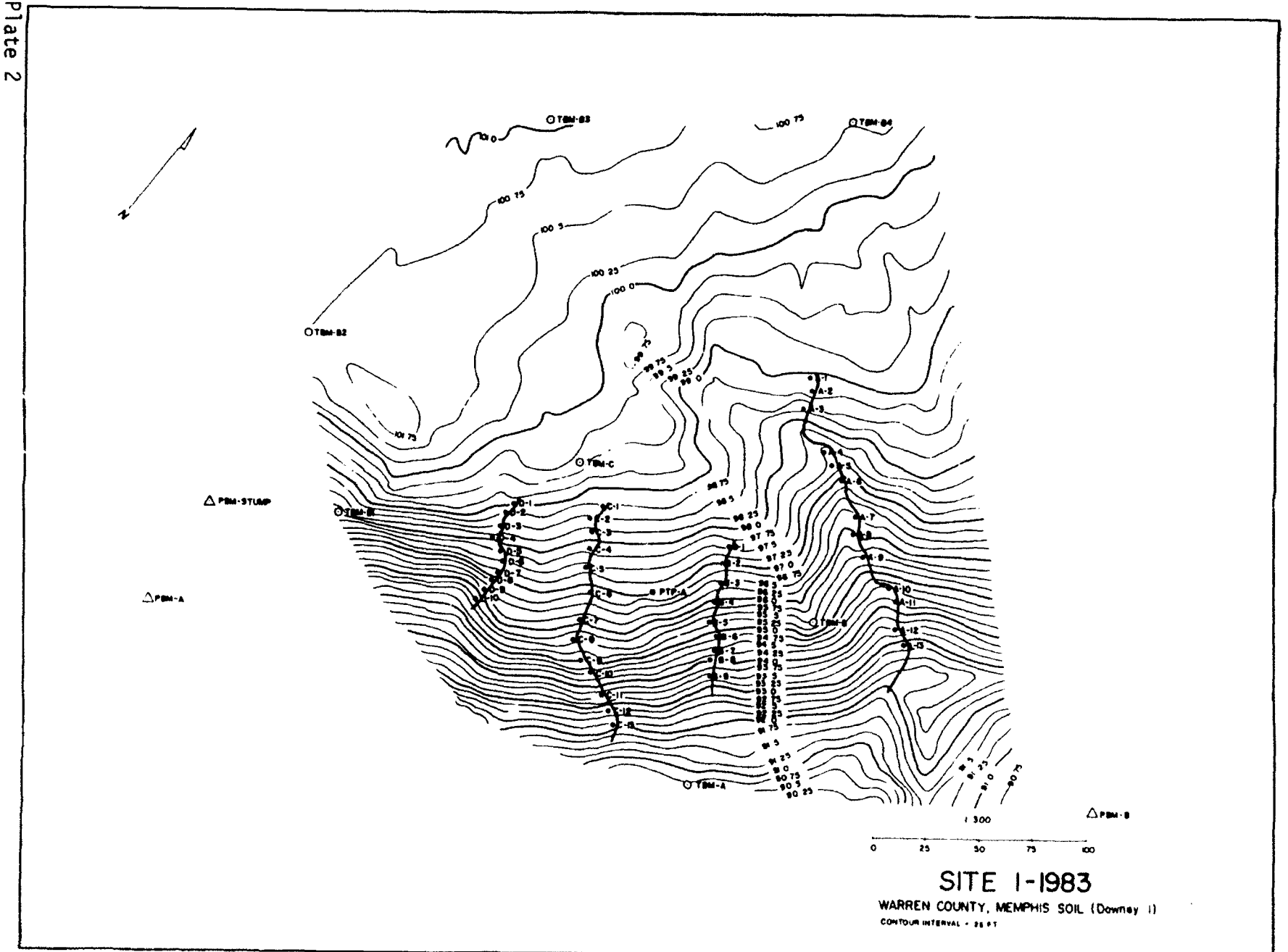
LEGEND
1985
1984
1983
1 300
0
25
50
75
100
SCALE IN FEET
SITE I
Warren County, Grenada Soil (Downey # 1)
CONTOUR INTERVAL = 25 FT

Plate 1

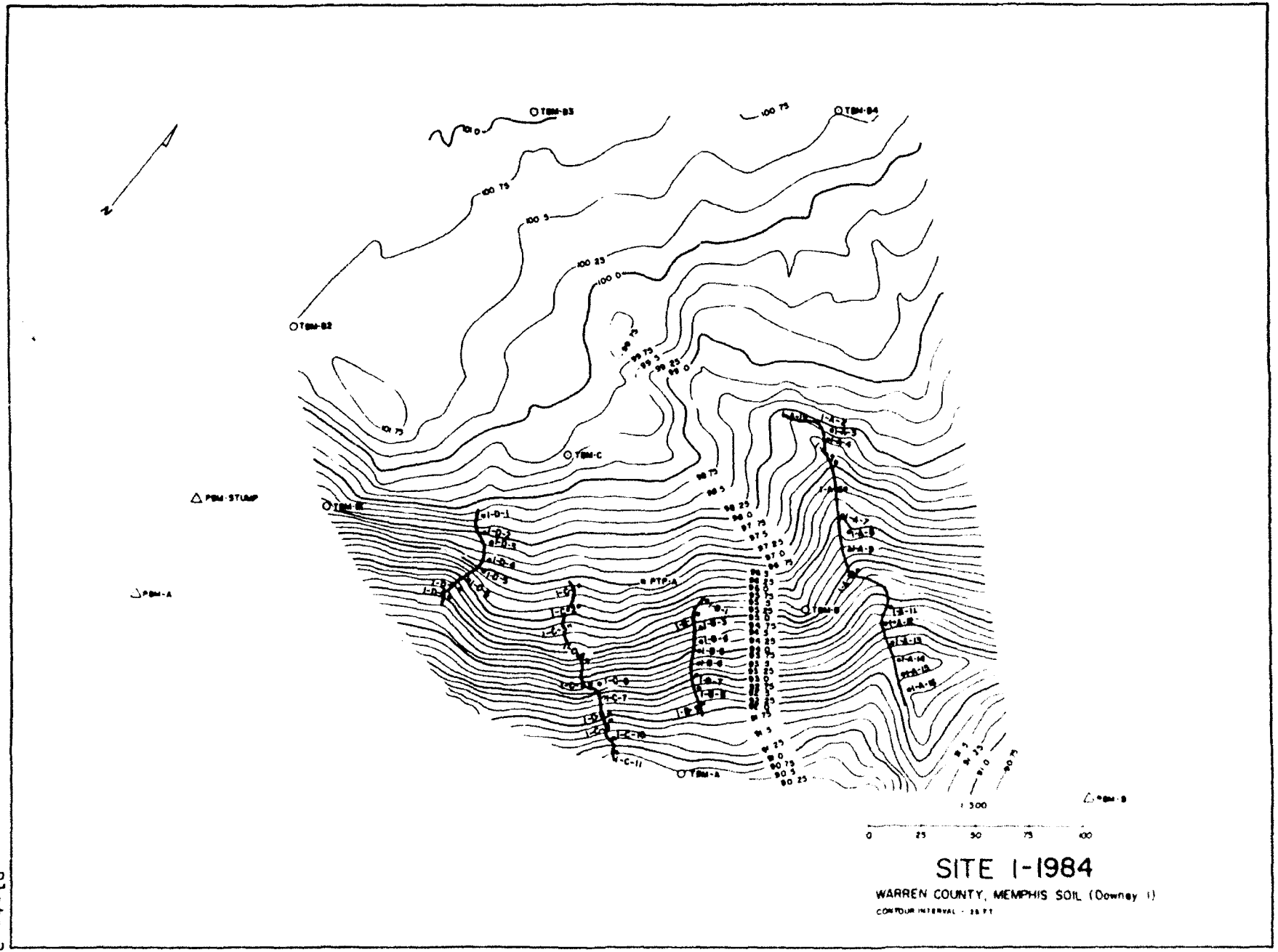
Plate 2



SITE 1-1983

WARREN COUNTY, MEMPHIS SOIL (Downey 1)

CONTOUR INTERVAL = 25 FT



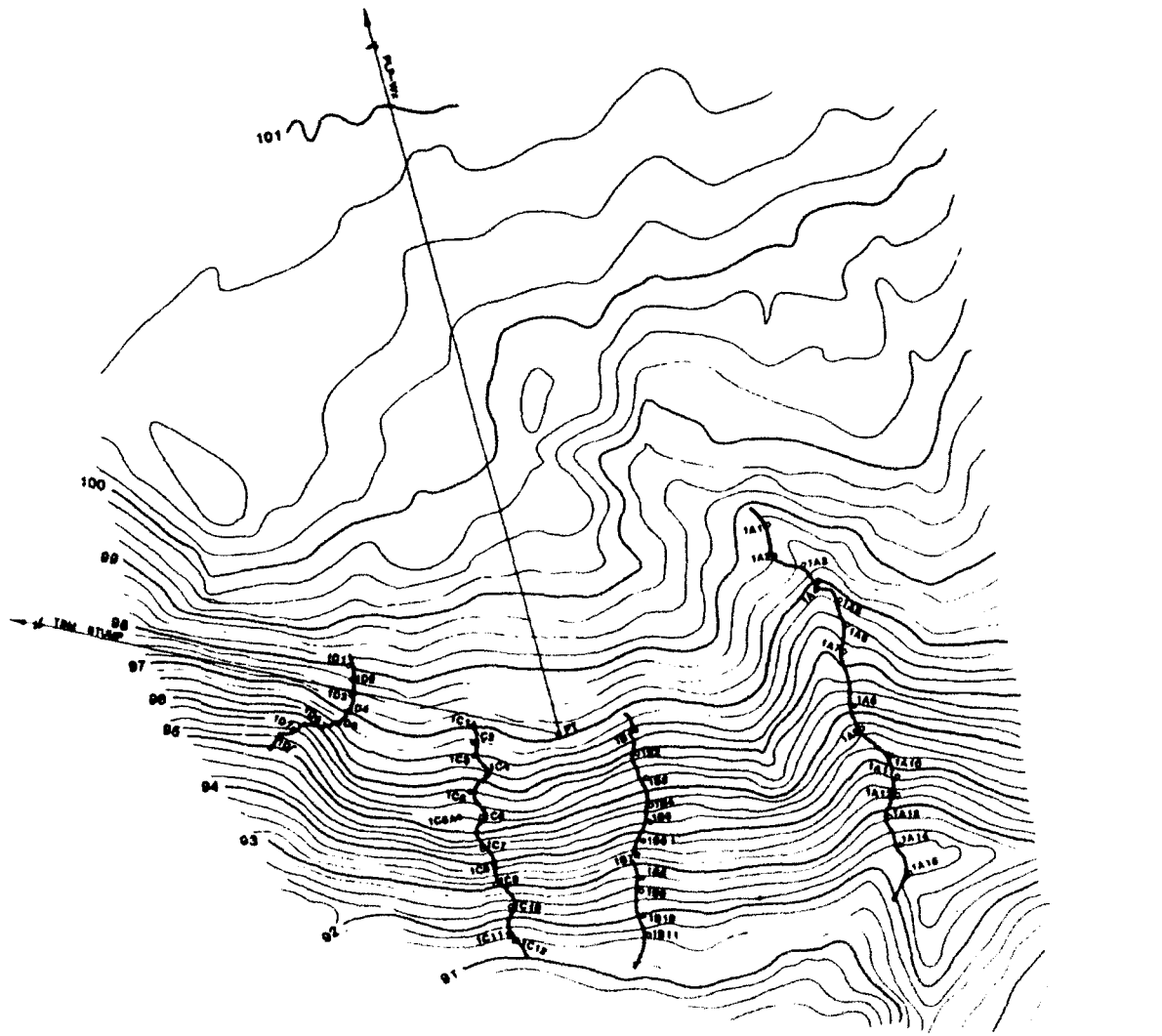
SITE 1-1984

WARREN COUNTY, MEMPHIS SOIL (Downey 1)

CONTOUR INTERVAL - 25 FT

Plate 3

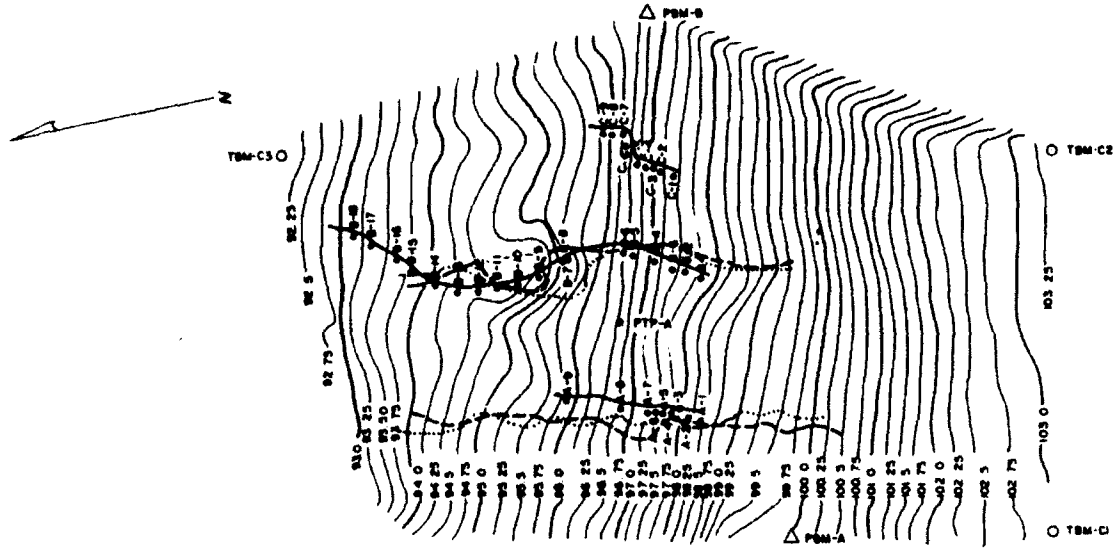
Plate 4



SITE 1-1985

Warren County, Grenada Soil (Downey # 1)

CONTOUR INTERVAL - 1 FT



LEGEND
1983
1984
1985

1 300
0 25 50 75 100

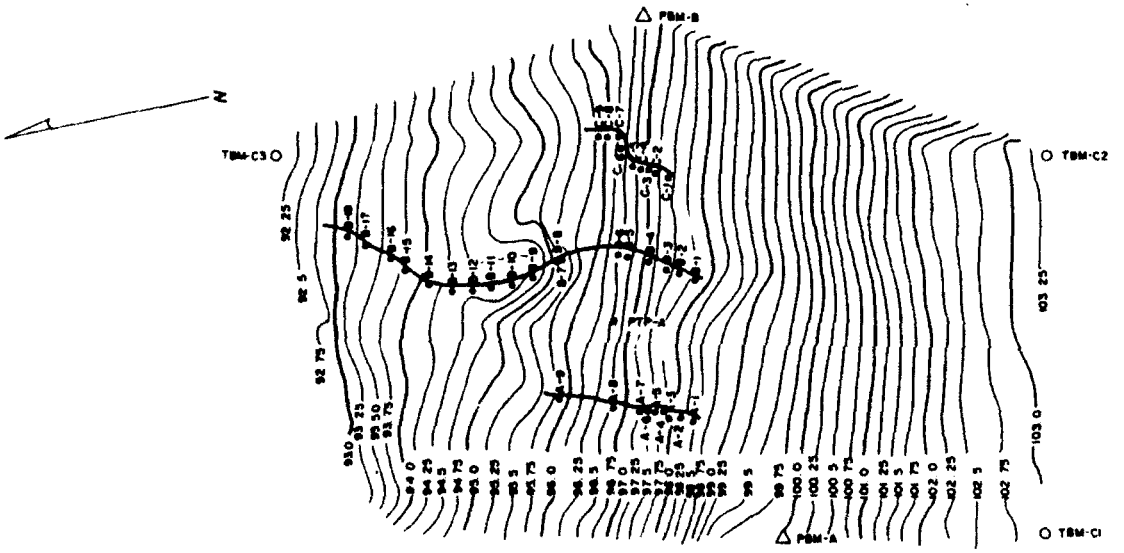
SITE 2

WARREN COUNTY, GRENADA SOIL (Downey 2)

CONTOUR INTERVAL = 25 FT

Plate 5

Plate 6



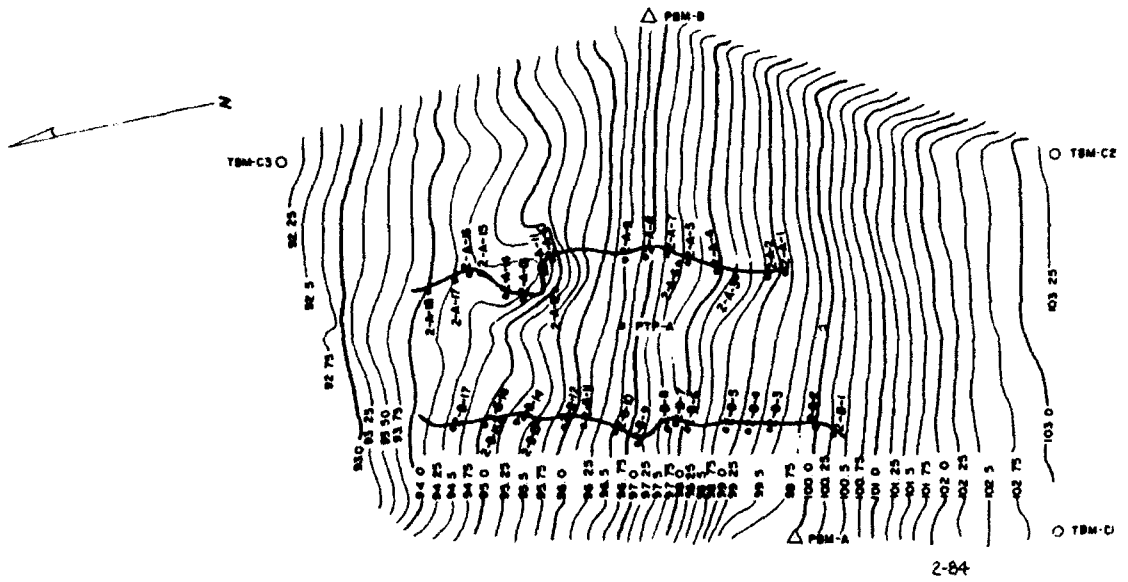
1 300

0 25 50 75 100

SITE 2-1983

WARREN COUNTY, GRENADA SOIL (Downey 2)

CONTOUR INTERVAL - 25 FT



1 500

0 25 50 75 100

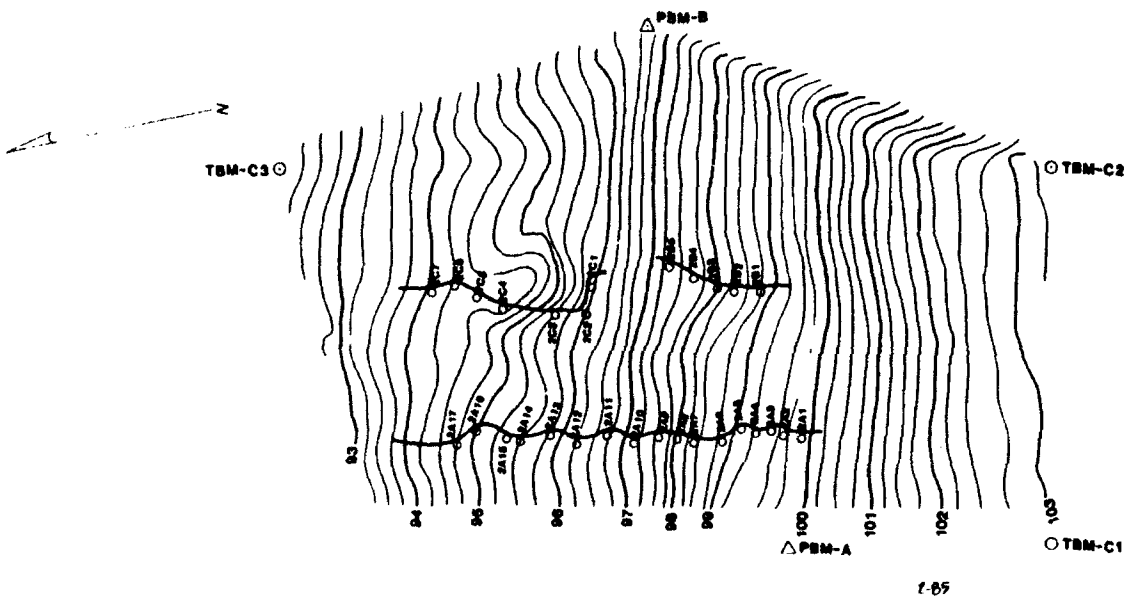
SITE 2-1984

WARREN COUNTY, GRENADA SOIL (Downey 2)

CONTOUR INTERVAL - 25 FT

Plate 7

Plate 8



1-85

1:300

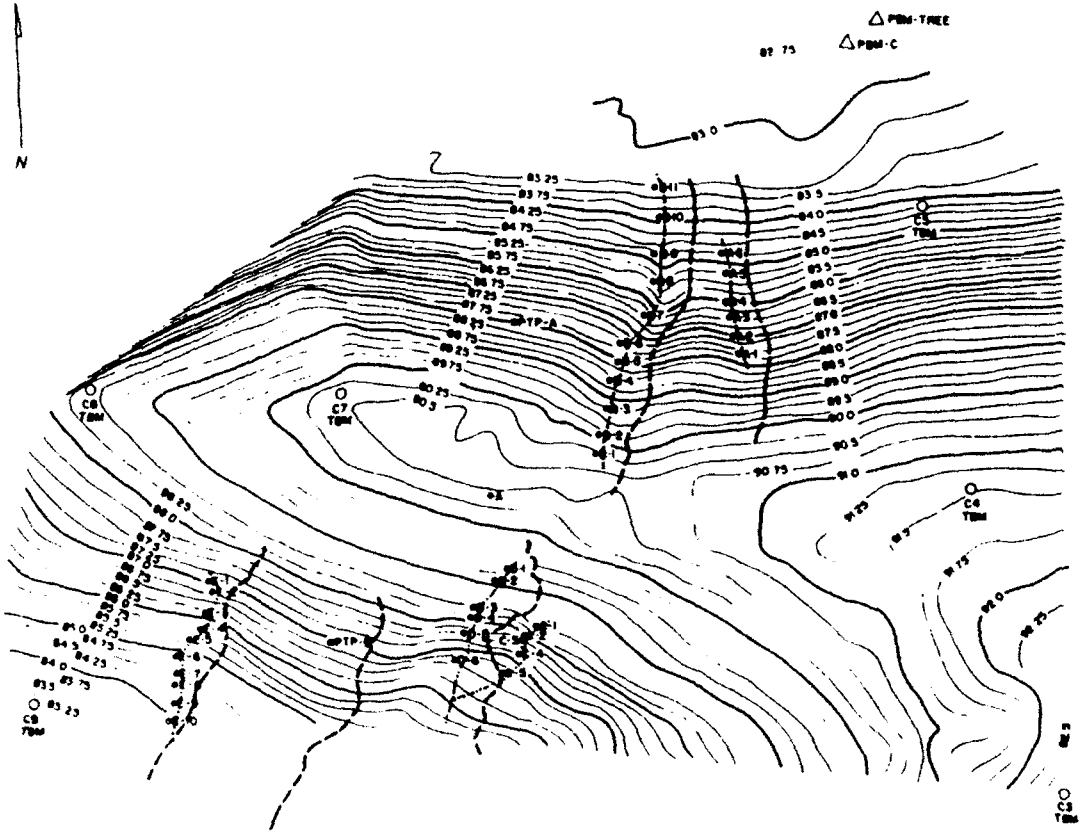
0 25 50 75 100

SCALE IN FEET

SITE 2-1985

Warren County, Grenada Soil (Downey #2)

CONTOUR INTERVAL - 2.5 FT



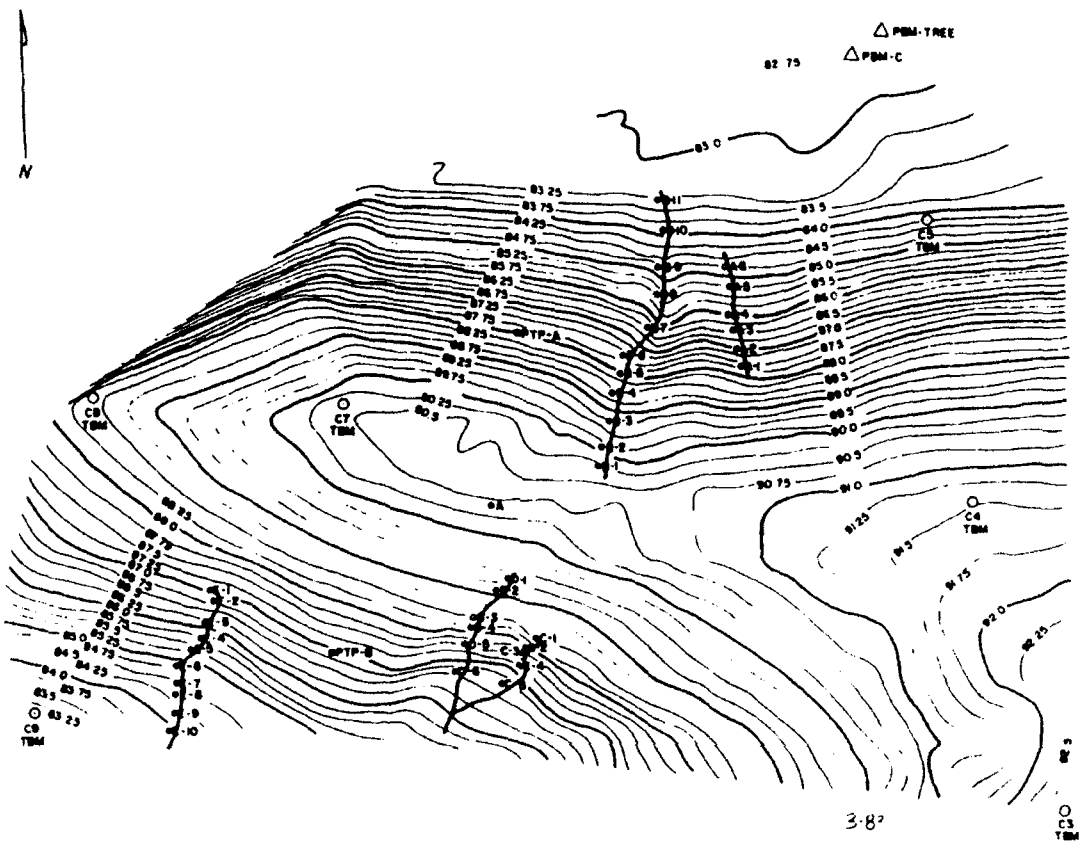
SITE 3

LORING SOIL, HINDS COUNTY (Mellon)

CONTOUR INTERVAL = 25 FT

Plate 9

Plate 10



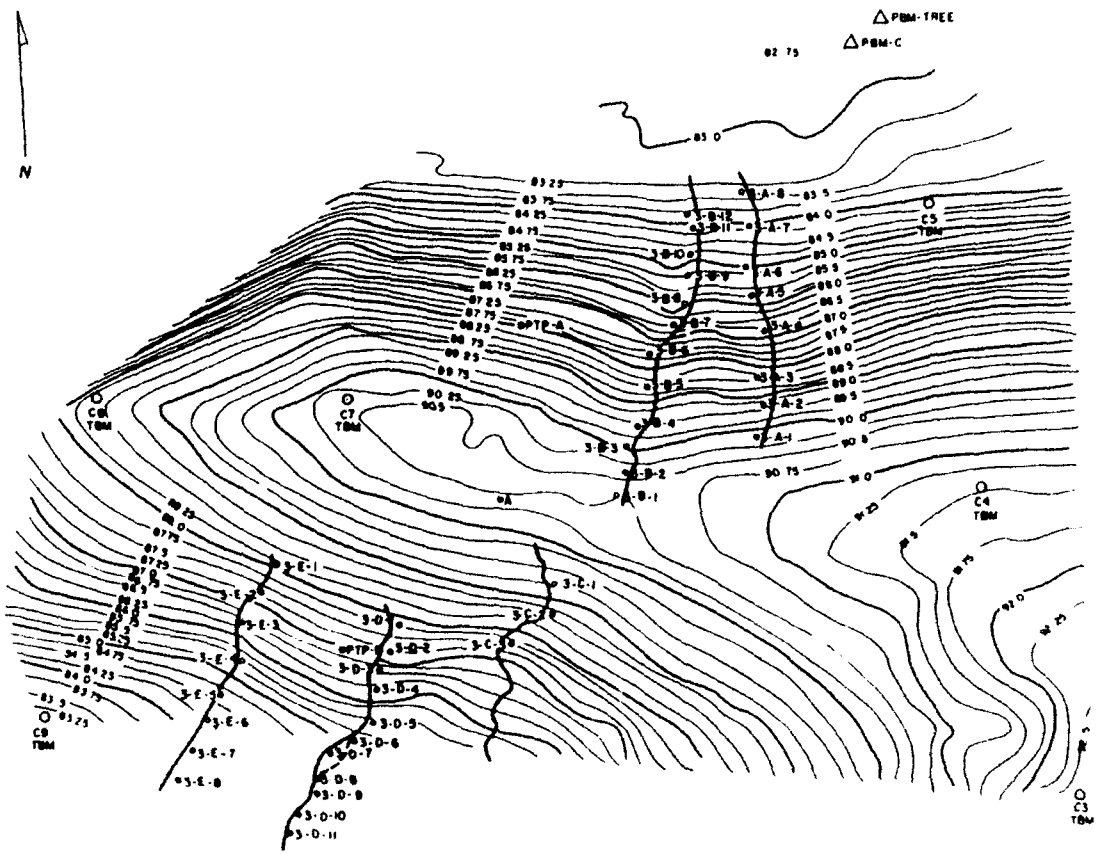
1 300

0 25 50 75 100

SITE 3-1983

LORING SOIL, HINDS COUNTY (Mellon)

CONTOUR INTERVAL = FEET



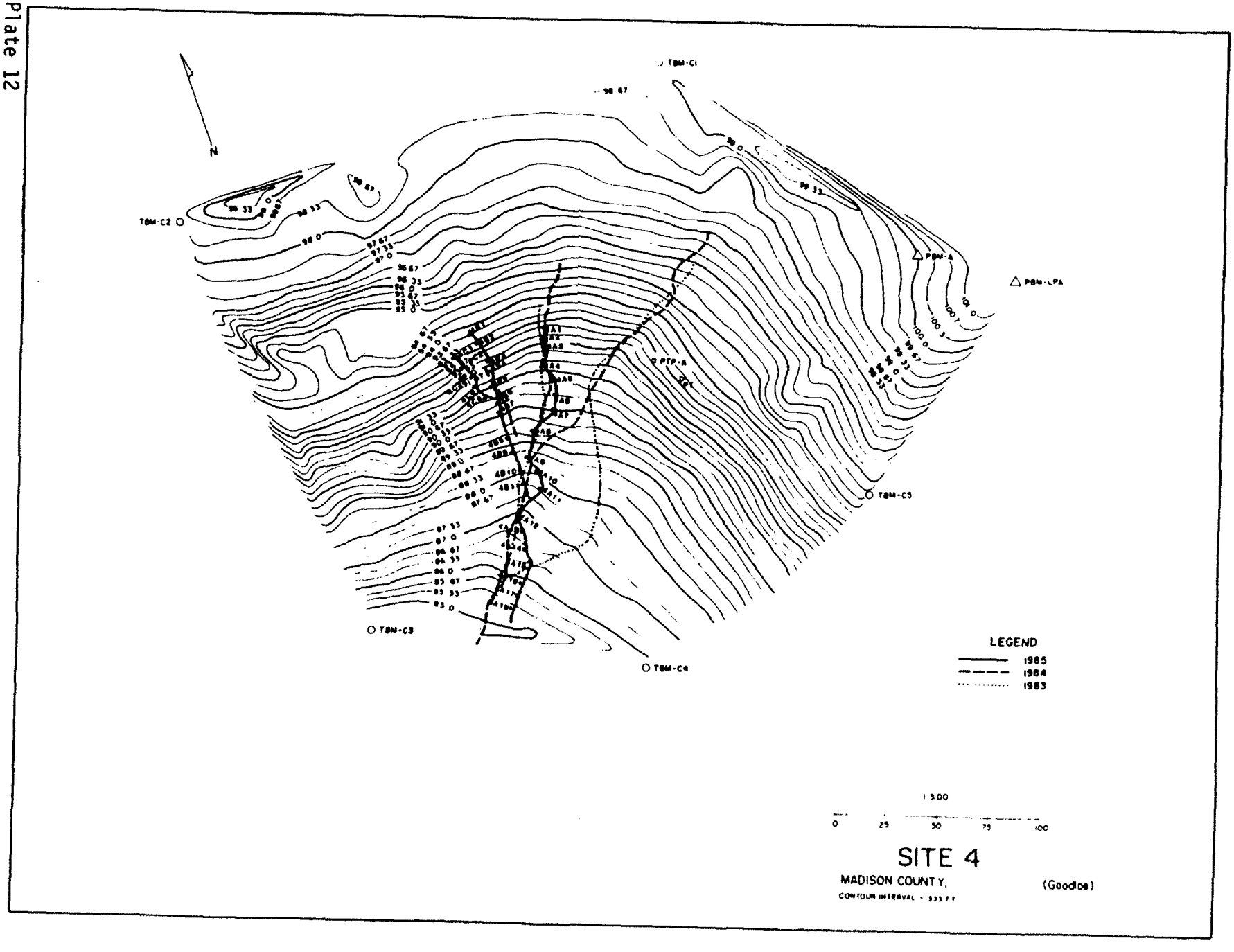
SITE 3-1984

LORING SOIL, HINDS COUNTY (Melon)

CONTOUR INTERVAL = 25 FT

Plate 11

Plate 12


TBM-C1
TBM-C2
TBM-C3
TBM-C4
TBM-C5
PBM-A
PBM-LPA
PTP-A
N
LEGEND
1985
1984
1983
1 300
0
25
50
75
100
SITE 4
MADISON COUNTY,
(Goodloe)

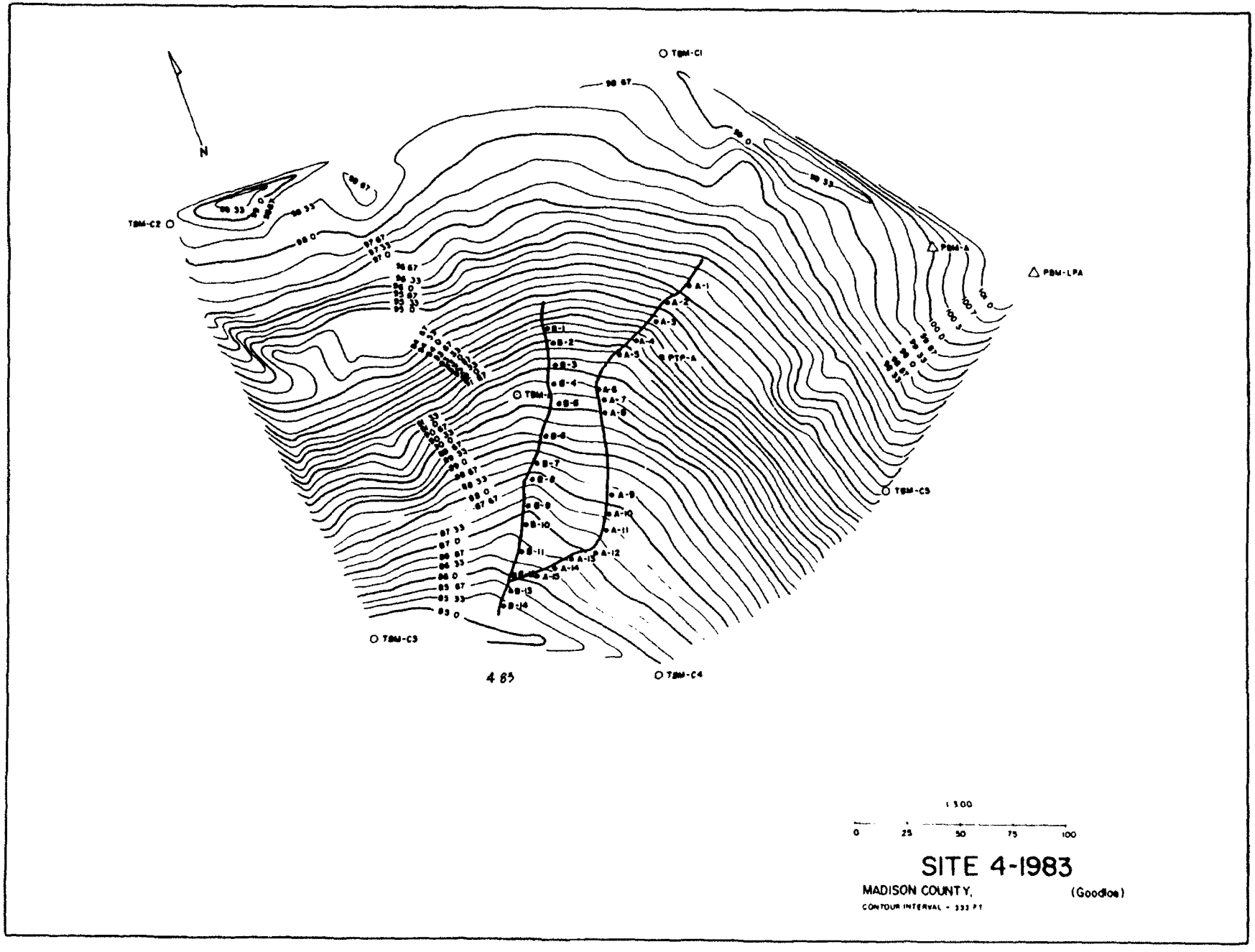

TBM-C1
TBM-C2
TBM-C3
TBM-C4
TBM-C5
PBM-A
PBM-LPA
TBM-1
PTP-A
A-1
A-2
A-3
A-4
A-5
A-6
A-7
A-8
A-9
A-10
A-11
A-12
A-13
A-14
A-15
B-1
B-2
B-3
B-4
B-5
B-6
B-7
B-8
B-9
B-10
B-11
B-13
B-14
N
4 85
1 500
0
25
50
75
100
SITE 4-1983
MADISON COUNTY,
(Goodloe)
CONTOUR INTERVAL = 333 FT

Plate 13

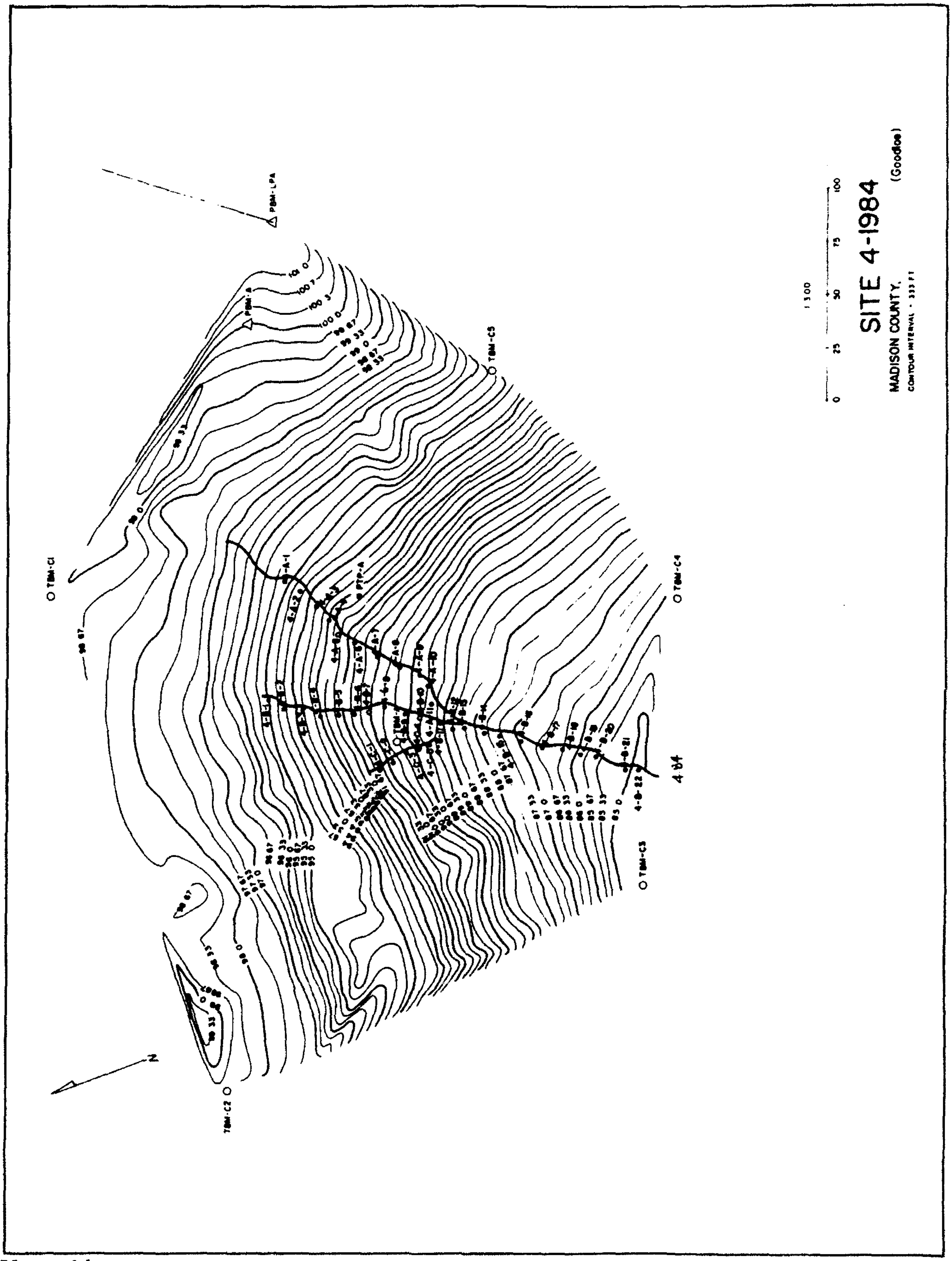
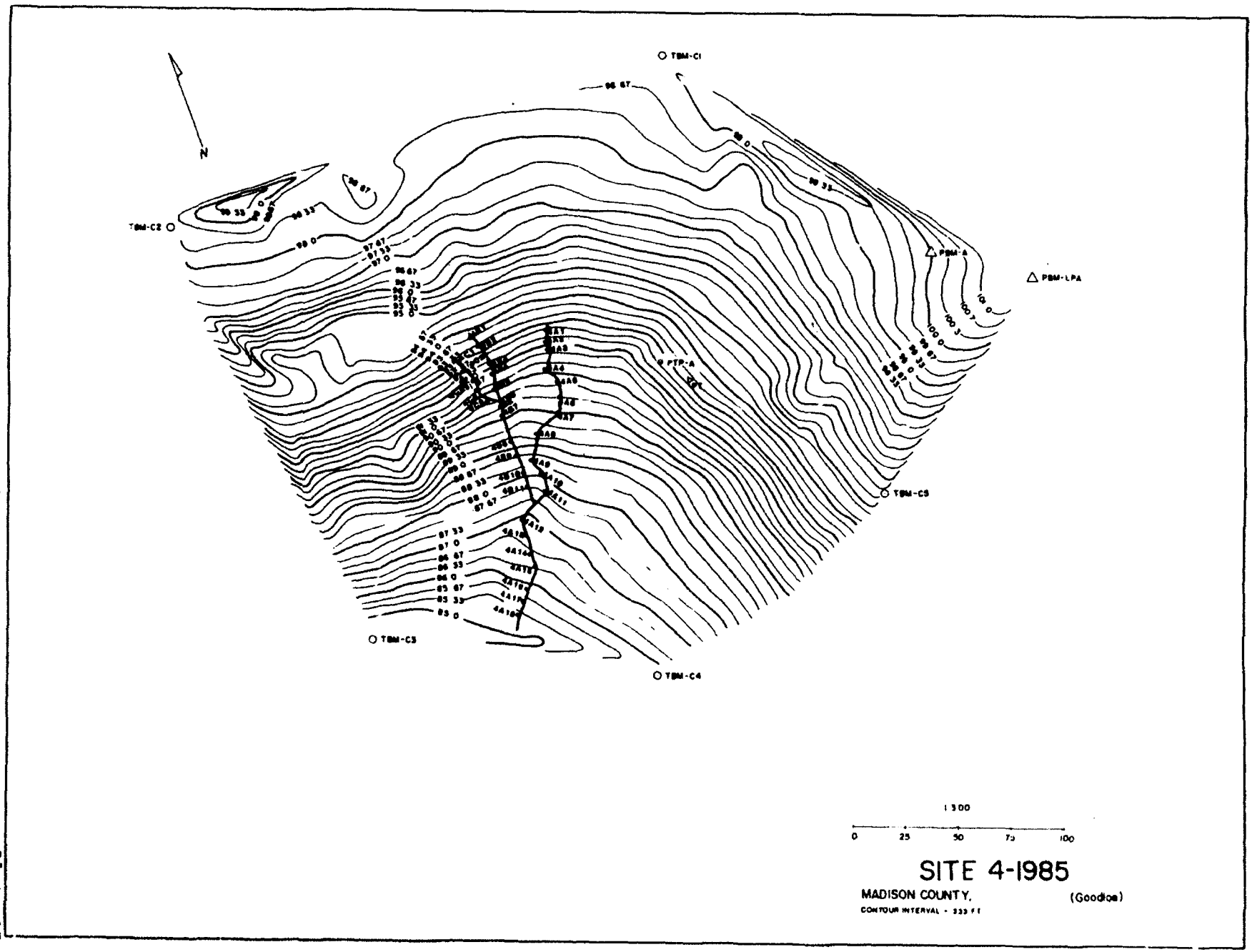

SITE 4-1984
MADISON COUNTY,
(Goodloe)
TBM-C1
TBM-C2
TBM-C3
TBM-C4
TBM-C5
N

Plate 14



SITE 4-1985

MADISON COUNTY, (Goodloe)

CONTOUR INTERVAL = 333 FT

Plate 15

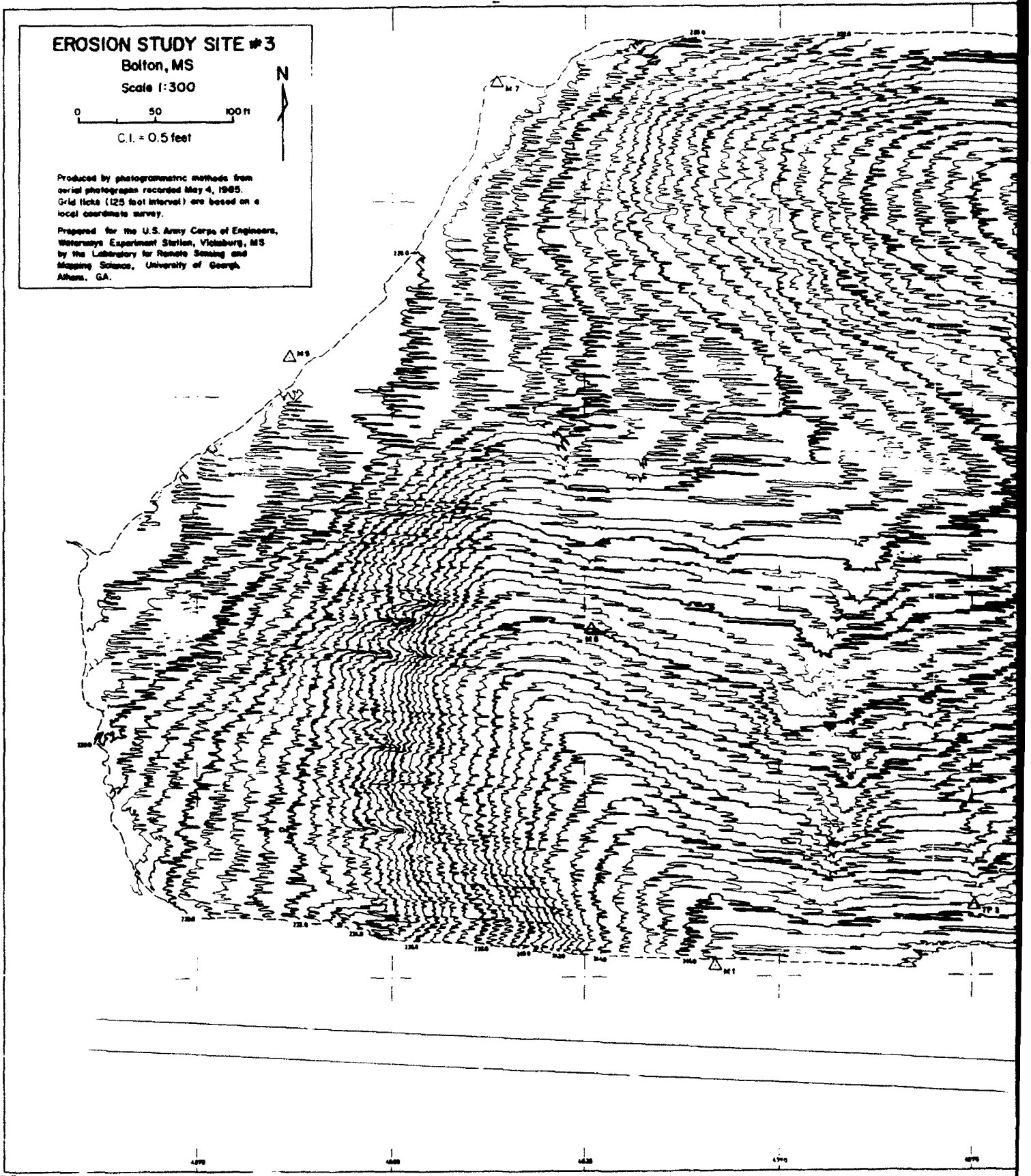
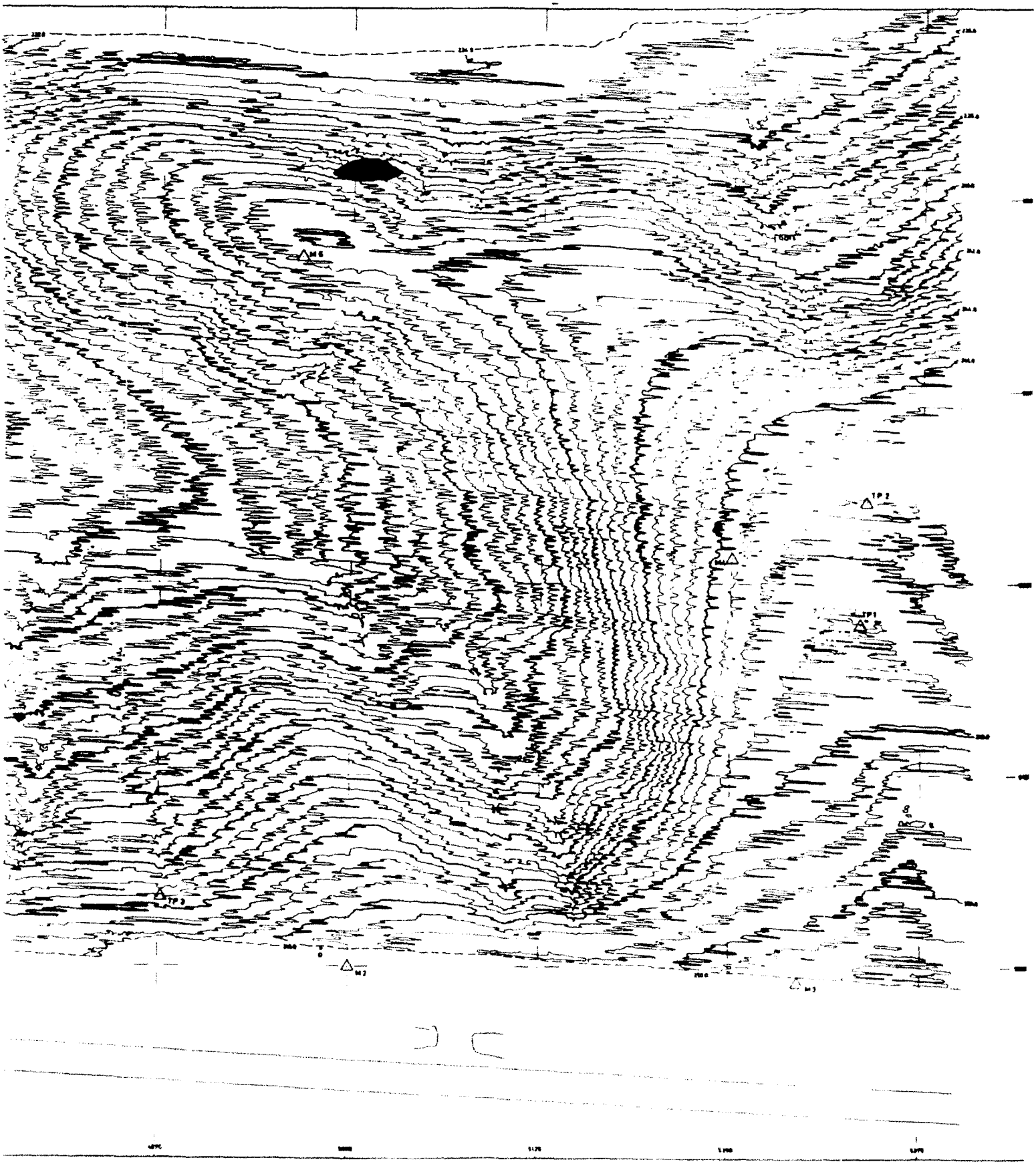
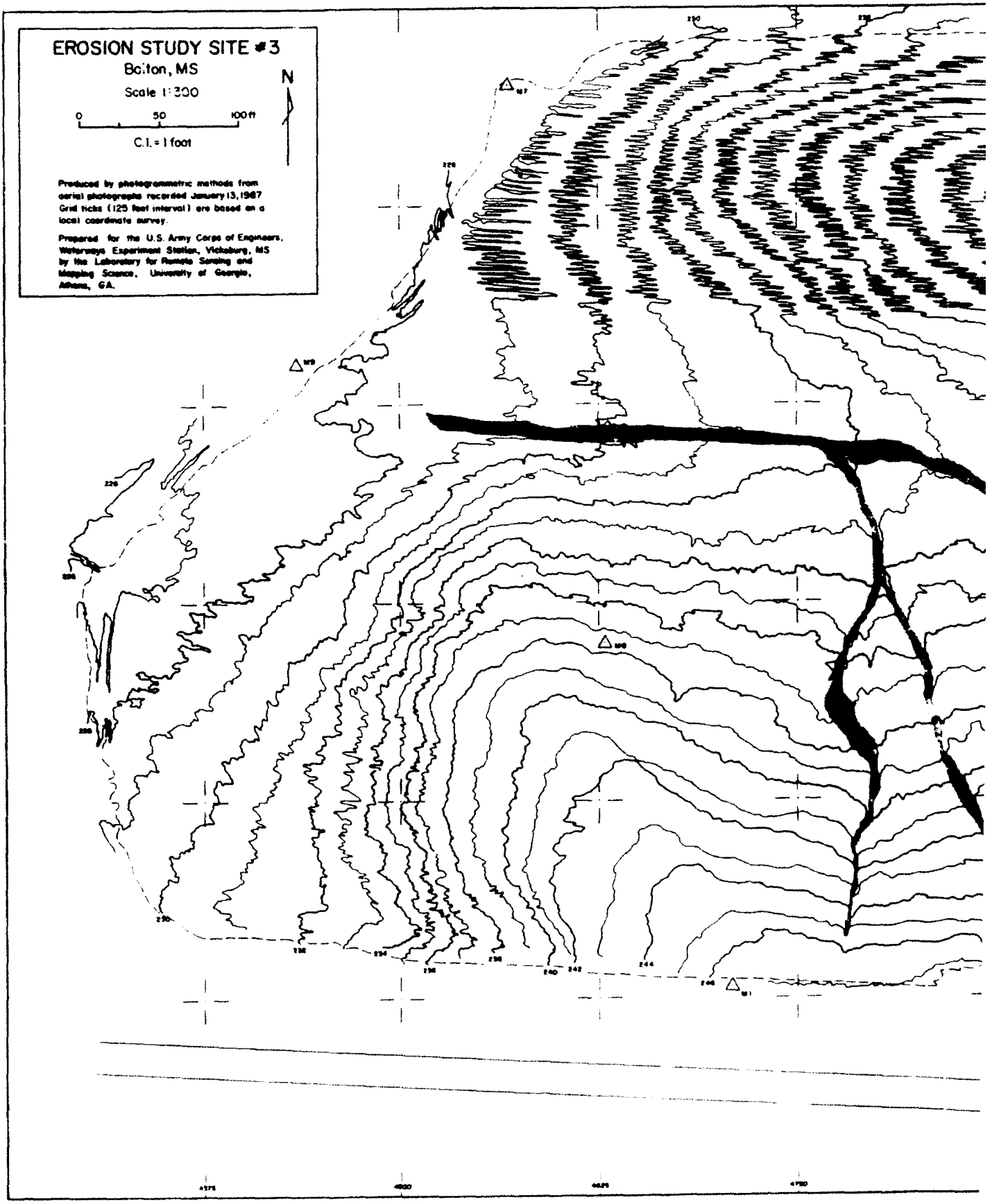
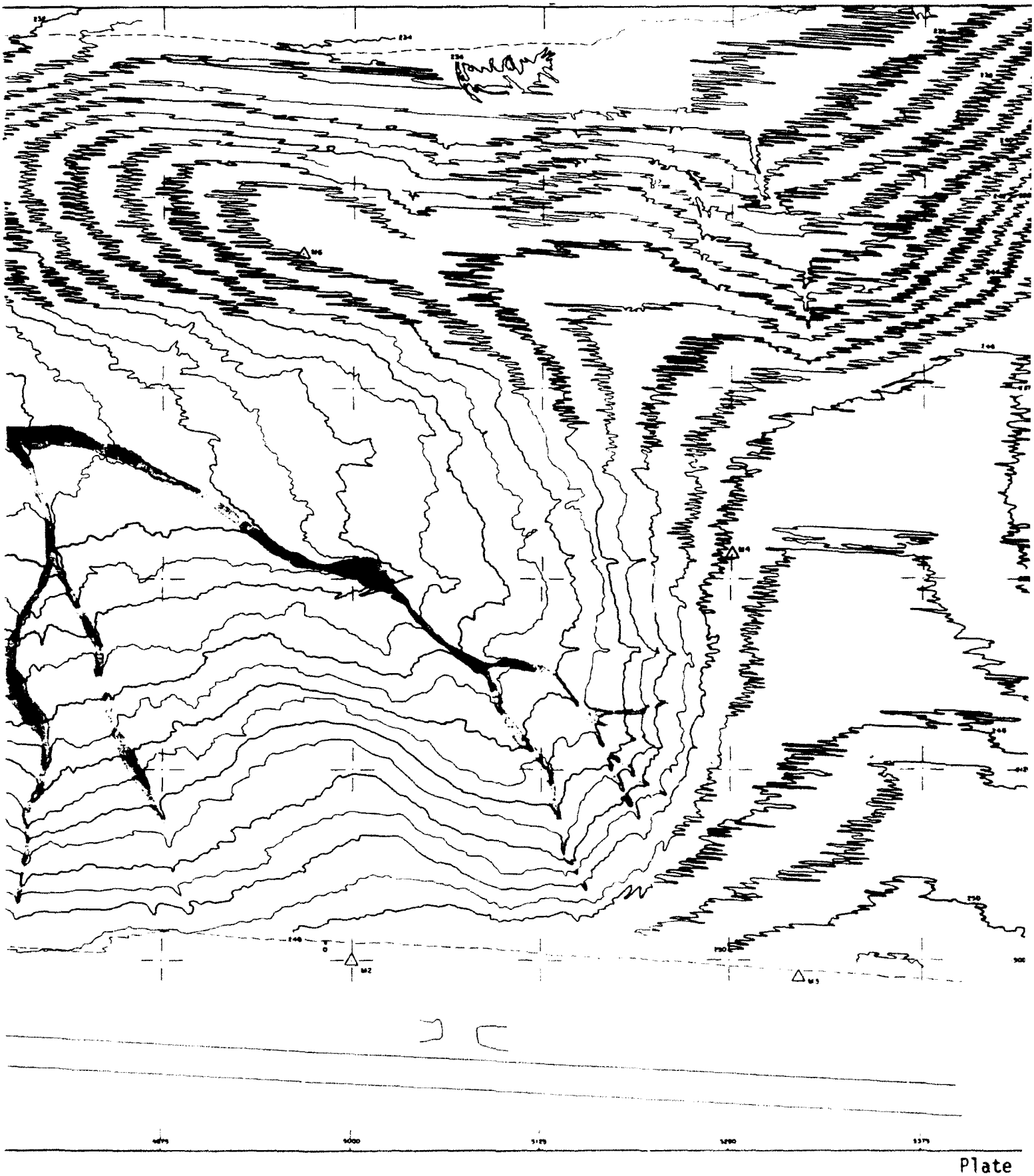

EROSION STUDY SITE #3
Bolton, MS
Scale 1:300
0
50
100 ft
C.I. = 0.5 feet
N
Produced by photogrammetric methods from aerial photographs recorded May 4, 1985. Grid ticks (125 foot interval) are based on a local coordinate survey.
Prepared for the U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS by the Laboratory for Remote Sensing and Mapping Science, University of Georgia, Athens, GA.
M7
M9
M8
M1
TP1

Plate 16

A


TP 2
TP 1
TP 3
M 6
M 2
M 3


EROSION STUDY SITE #3
Bolton, MS
Scale 1:300
0
50
100 ft
C.I. = 1 foot
N
Produced by photogrammetric methods from aerial photographs recorded January 13, 1987. Grid ticks (125 foot interval) are based on a local coordinate survey.
Prepared for the U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS by the Laboratory for Remote Sensing and Mapping Science, University of Georgia, Athens, GA.



Plate

Appendix A
Data Analysis Scope of Work

DEPARTMENT OF THE ARMY
WATERWAYS EXPERIMENT STATION, CORPS OF ENGINEERS
PO BOX 631
VICKSBURG, MISSISSIPPI 39180

REPLY TO ATTENTION OF

June 13, 1983

WESGR

Mr. Peter Forsythe, P.E.
State Conservation Engineer
Soil Conservation Service
Suite 1321, Federal Building
100 West Capitol Street
Jackson, Mississippi 39269

Dear Pete:

I am pleased that we will be able to work directly with Mike Harvey at Colorado State University on the analysis of the ephemeral gully data. Mike and I have discussed the ephemeral gully study at length and I believe we have very similar ideas about the theoretical found tions, methodology, and objectives of the study. Mike's experience and knowledge will be most beneficial in our investigation of the development of ephemeral gullies.

Enclosed you will find a statement of work for the data analysis phase (Enclosure 1). Also enclosed are a listing of the computer program for gully measurement data reduction (Enclosure 2), an example of the output of the computer program (Enclosure 3), and a copy of the shop drawings for the gully measuring device (Enclosure 4). I will make some black and white photographs of the gully measuring device and send them to you. I will send a copy of these materials to Mike Harvey as well.

I spoke with Mike on June 10 and informed him of our plans. When advised of E. C. Nicholas' visit the week of July 7, he said he would try to visit that week as well. Colin Thorne is trying to arrange a visit early this summer also to talk about the ephemeral gully study. I asked Mike to check with Colin to see if he could accompany him at that time so we could all get together and talk about ephemeral gullies either here or at Oxford.

I will keep you informed as things progress.

Sincerely,

Lawson M. Smith
Supervisory Geologist
Regional Studies Unit
EGRMD

Enclosures

Statement of Work

Ephemeral Gully Data Analysis

Background

The Engineering Geology Applications Group (EGAG), Geotechnical Laboratory, is conducting a study of soil loss due to the development of ephemeral gullies for the Mississippi office of the Soil Conservation Service, USDA. The study will involve five phases: (1) development of a research plan; (2) establishment of data gathering sites; (3) acquisition of data; (4) data analysis; and (5) report preparation. EGAG will perform phases 1 through 3 and part of phase 5. Phase 4 and part of phase 5 will be performed by the contractor. This document outlines the objectives, final product, and scope of investigations and type of data of the ephemeral gully study.

Objectives

The present accepted method of calculating soil loss from agricultural fields, the Universal Soil Loss Equation (USLE), predicts annual soil loss due solely to rill and interrill erosion, and not soil loss due to gully erosion. Consequently, a substantial proportion of total soil loss from agricultural fields may be undetermined. The goal of the investigation is to determine a method to predict the amount of annual soil loss that is due to the development of ephemeral gullies. (Ephemeral gullies are defined as small drainageways which develop seasonally between cultivation practices, which, if not filled in, would become permanent features of the drainage network. Ephemeral gullies may reach a width of 2-3 ft and a depth of 1-1.5 ft.) The specific objectives of the work to be performed by the contractor are:

a. Identify the factors which affect the rate and extent of ephemeral gully development.

b. Evaluate the relationship of these factors (identified in the initial objective) to the factors used in the USLE.

c. Develop a predictive (numerical) method for determining the amount of annual soil loss due to the development of ephemeral gullies for the sites studied. It is highly desirable that the method be the application of a

modification factor to the USLE. However, if a similar, easily understood procedure can be developed and used in conjunction with the USLE, this will be acceptable.

d. Evaluate the suitability of the method developed in objective c for extrapolation to areas of similar topography, climate, soils, and agricultural practices.

e. Prepare a report documenting objectives a through d.

Investigations

The investigation will be conducted at four field sites located in Warren (sites 1 and 2), Hinds (site 3), and Madison (site 4) counties of west-central Mississippi. The sites were selected on Memphis, Loring, and Providence soils developed on loess of various thicknesses. At each site, SCS personnel will compute the estimated annual soil loss using the USLE. This soil loss computation will provide an estimate for annual rill and interrill erosion to be compared with soil loss from ephemeral gullies. In this manner, the amount of underestimation of soil loss by the USLE can be determined, providing an empirically derived factor for correcting USLE values in other areas not included in the study.

Four broad areas of investigation will be conducted at each site. The four areas can be described as follows:

a. Energy available for erosion.

b. Resistance of soil materials.

c. Drainage network development.

d. Volume of sediment production.

There are two components of the total energy in the system. They are the kinetic energy in the form of rainfall (duration, intensity, and frequency) and the potential energy in the form of the inherent morphology of the site (drainage area, slope length, slope angle, slope shape (planar, convex, concave)). A recording raingage has been installed at each site and detailed topographic maps have been prepared to determine the topographic variables.

The physical characteristics of the soil materials at each site will be measured and quantified. This will include the determination of grain-size distributions, bulk densities, permeability, structure and percentage organic matter. Soil moisture will be monitored at weather stations on two sites.

Current agricultural practices and the cultivation history of each site will be determined. Farmers will be questioned to ascertain, if possible, when each ephemeral gully was initiated, thereby providing a time base upon which to determine the rate of gully development.

The extent of drainage-network development will be determined by accurately surveying the channel network before and after the site is subjected to cultivation. Cross sections of the various channel reaches will be surveyed using a device which records the shape of the gully cross section. Longitudinal profiles of the various channels making up the drainage network will also be constructed from survey data. Resurveying of the sites will be conducted at intervals during the seasonal erosional cycles.

Morphometric analysis of the drainage-network data will be conducted to relate the network characteristics to drainage area and watershed characteristics (Strahler, 1956; Shreve, 1966, 1967). Glock's (1931) qualitative model of drainage-network development will also be used to determine the degree of maturity of the ephemeral-gully system. This determination will be required to assess whether total sediment yield should include a component derived from extension of the drainage network. If a time base can be established then it should be possible to predict the rate of drainage-network extension and to relate this to sediment production.

The volume of sediment produced annually by the ephemeral-gully system has three potential contributing sources. The first of these is the annual volume of material used to fill in the gullies prior to or during cultivation which is subsequently eroded by exhumation of the ephemeral gully system. If headward extension of the network is continuing, then the volume of sediment eroded will have to be included. The third component is the amount of sediment derived from interrill and rill erosion which is delivered to the ephemeral-gully channel system.

Determination of the volumes of sediment produced by each of the components can only be approximate in a study of this nature. The volume of material produced by exhumation and drainage-network extension can be determined from changes in cross section area of the channels throughout the course of the annual cycle. Soil loss due to rill and interrill erosion will be estimated by the USLE.

Specific Data

Several types of data are being obtained at the four field sites. They are:

a. Detailed topographic maps of the sites at the scale of 1:300. On each map are topographic contours (0.25-ft interval), location of temporary bench marks and gully measuring stations, location of the weather station, and the location of the soil pit (used in defining the typical soil horizons). The topographic map was constructed from electronic distance measurements and the gully measurement stations located by planetable methods.

b. Cross-sectional area for each gully measurement station at various dates. Prior to cultivation in May 1983, a total of 146 stations were measured on two occasions (weeks of March 15 and April 20). At site 1 (Memphis soil), 45 stations on four gullies were measured. At site 2 (also Memphis soil), 36 stations were measured on three gullies. Thirty-six stations were monitored on five gullies at site 3 (Loring soil). Twenty-nine stations on two gullies were measured at site 4 (Providence soil). Gully measurement stations will be reestablished upon harvesting of crops in the fall and measurements will be made at the frequency of about once per month. Gully measurement data consist of a full-scale reconstruction of gully cross section on graph paper, which is digitized and stored on tape for analysis on the Tektronics 4051 minicomputer. A program written for the 4051 determines the area, top width, mean width, wetted perimeter (at bankfull), mean depth, maximum depth, and hydraulic radius of each gully cross section, and plots the cross section at the scale of 1:5.

c. Meteorological data. At sites 1 and 3, complete meteorological stations have been installed which measure soil temperature (°C) at -5 cm and -10 cm, solar radiation (watts/m^2), air temperature (°C), relative humidity (percent), soil moisture (percent) at -10 cm, wind direction (degrees from north), wind speed (m/sec), and precipitation (mm/min). All parameters are measured hourly except precipitation, which is read every minute. Readings are stored as binary code on cassette tapes which are changed every month. At sites 2 and 4 only precipitation is recorded. Precipitation is measured by a tipping bucket rain gauge connected to a rotating drum chart recorder. Precipitation records are changed weekly at sites 2 and 4.

d. Site photography. Each site is photographed periodically using a 35 mm camera. Complete photographic coverage of each gully is acquired coincident with gully measurement to facilitate estimation of gully volume between measurement stations. At the present, an attempt is being made to establish a capability for acquiring vertical (aerial) stereoscopic photographic coverage on a 70 mm format. This high-quality photography will greatly enhance gully definition and measurement.

e. Soil properties. At each site, the typical soil horizons have been defined. Specific properties of the soil horizons for each site will be determined in the field and the laboratory, including soil texture, bulk density, permeability, structure, and percentage of organic matter. Soil density and moisture is being determined gravimetrically at sites 1 and 3 on a weekly basis for correlation with meteorological parameters.

June 13, 1983

WESGR

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State Conservation Engineer
Soil Conservation Service
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100 West Capitol Street
Jackson, Mississippi 39269

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Sincerely,

Lawson M. Smith
Supervisory Geologist
Regional Studies Unit
EGRMD

Enclosures

Appendix B
Soil Descriptions

Memphis Silt Loam - Site 1

Fine silty mixed thermic Typic Hapludalfs

Location: Warren County Owner: Herbert Downing Crop: Crop: Soybeans 1982. Winter cover ; grass and wild winter peas.

Ap - 0 to 4 inches; dark yellowish brown (10YR5/4) silt loam; weak medium and fine granular structure; friable; many fine roots; strongly acid; abrupt smooth boundary.

Bt1 - 4 to 16 inches; dark brown (7.5YR4/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; many fine roots; continuous clay films on ped; few gray silt coatings between peds; very strongly acid; clear smooth boundary.

Bt2 - 16 to 33 inches; dark brown (7.5YR4/4) silt loam; weak medium subangular blocky structure; friable few fine roots; patchy clay film on peds; few dark coating on faces of peds few gray silt coatings between peds; strongly acid; gradual smooth boundary.

C - 33 to 72 inches; yellowish brown (10YR5/4) silt loam; massive; few fine roots; few gray silt coatings along crevices; neutral to moderately alkaline.

Remarks: This soil is rather shallow over unweathered silt, but within range of the Memphis series.

Memphis Silt Loam - Site 2

Fine silty mixed thermic Typic Hapludalfs

Location: Warren County Owner: Herbert Downing Crop: Soybeans 1982. Winter cover grass and wild winter peas.

Ap - 0 to 4 inches; dark yellowish brown (10YR4/4) silt loam; weak medium and fine granular structure; friable; many fine roots; strongly acid; abrupt smooth boundary.

Bt1 - 4 to 17 inches; dark brown (7.5YR4/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; many fine roots; continuous clay films on peds; very strongly acid; gradual wavy boundary.

Bt2 - 17 to 37 inches; dark brown (7.5YR4/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; many fine roots; continuous clay films on peds. Very strongly acid; gradual wavy boundary.

Bt3 - 37 to 64 inches; dark brown (7.5YR4/4) silt loam; weak medium subangular blocky structure; friable; few patchy clay films on some peds; few silt coating on faces of some peds; strongly acid; gradual smooth boundary.

C - 64 to 72 inches; dark brown (7.5YR4/4) silt loam; massive; friable gray silt coatings in cracks or crevices; medium acid.

Remarks: Typical Memphis Soil

Loring Silt Loam: Site 3

Fine-silty mixed thermic Typic Fragiudalf

Location: Hinds County Owner: Bobby Mellon Crop: Cotton 1982

Ap - 0 to 5 inches; Dark yellowish brown (10YR4/4) silt loam; weak fine and medium gramular structure; many fine fine roots; medium acid; clear abrupt boundary.

Bt - 5 to 14 inches; brown (7.5YR4/4) silt loam; moderate fine and medium subangular blocky structure; few fine roots; patchy clay film on faces of peds; clay film in pores and root channels; common dark coatings on faces of peds, few gray coatings between peds; very strongly acid; gradual irregular boundary.

Bx1 - 14 to 42 inches; mottled yellowish brown (10YR5/6) grayish brown (10YR5/2) and brown (7.5YR4/4) silt loam; coarse weak prismatic parting to moderate medium subangular blocky structure; firm compact and brittle many fine voids thin patchy clay films on faces of peds and lining pores; common dark coatings on faces of peds; common gray coating between peds; very strongly acid gradual wavy boundary.

Bx2 - 42 to 54 inches; mottled brownish yellow (10YR6/6) grayish brown (10YR5/2) and yellowish brown (10YR5/4) silt loam; weak coarse prismatic parting to fine and medium subangular blocky structure; firm compact brittle; few fine roots between prisms; many fine voids; patchy clay films on faces of peds; common

dark coatings on faces of peds; common gray coatings between peds; gradual wavy boundary; very strongly acid.

B3 - 54 to 60 inches mottled yellowish brown (10YR5/4) brownish yellow (10YR6/6) and grayish brown (10YR5/2) silt loam, weak medium subangular blocky structure; friable; strongly acid; clear smooth boundary.

C - 60-72 inches; yellowish brown (10YR6/6) silt loam many medium distinct grayish brown mottles (10YR5/2) massive; friable; medium acid.

Remarks: There is evidence of severe sheet erosion with chiseling or subsoiling plowing in the upper portion of the fragipan. Depth to the fragipan for a nonseverly eroded Loring ranges from 20 to 35 inches.

4/83

Providence Silt Loam: Site 4

Fine silty mixed thermic Typic Fragiudalf

Location: Madison County Owner: James Goodloe, Sr. Crop: Soybeans 1982

Ap - 0 to 6 inches; brown (10YR4/3) silt loam; weak fine and medium granular structure; very friable; many fine roots; neutral; clear abrupt boundary.

Bt1 - 6 to 9 inches; dark yellowish brown (10YR4/4) silt loam; weak fine fine subangular blocky structure friable; common fine roots; common fine and medium pores; few patchy clay film on ped faces; strongly acid; clear smooth boundary.

Bt2 - 9 to 14 inches; brown (7.5YR4/4) silt loam; moderate fine and medium subangular blocky structure; few fine roots; patchy clay film on faces of peds; clay film in pores and root channels; strongly acid; clear smooth boundary.

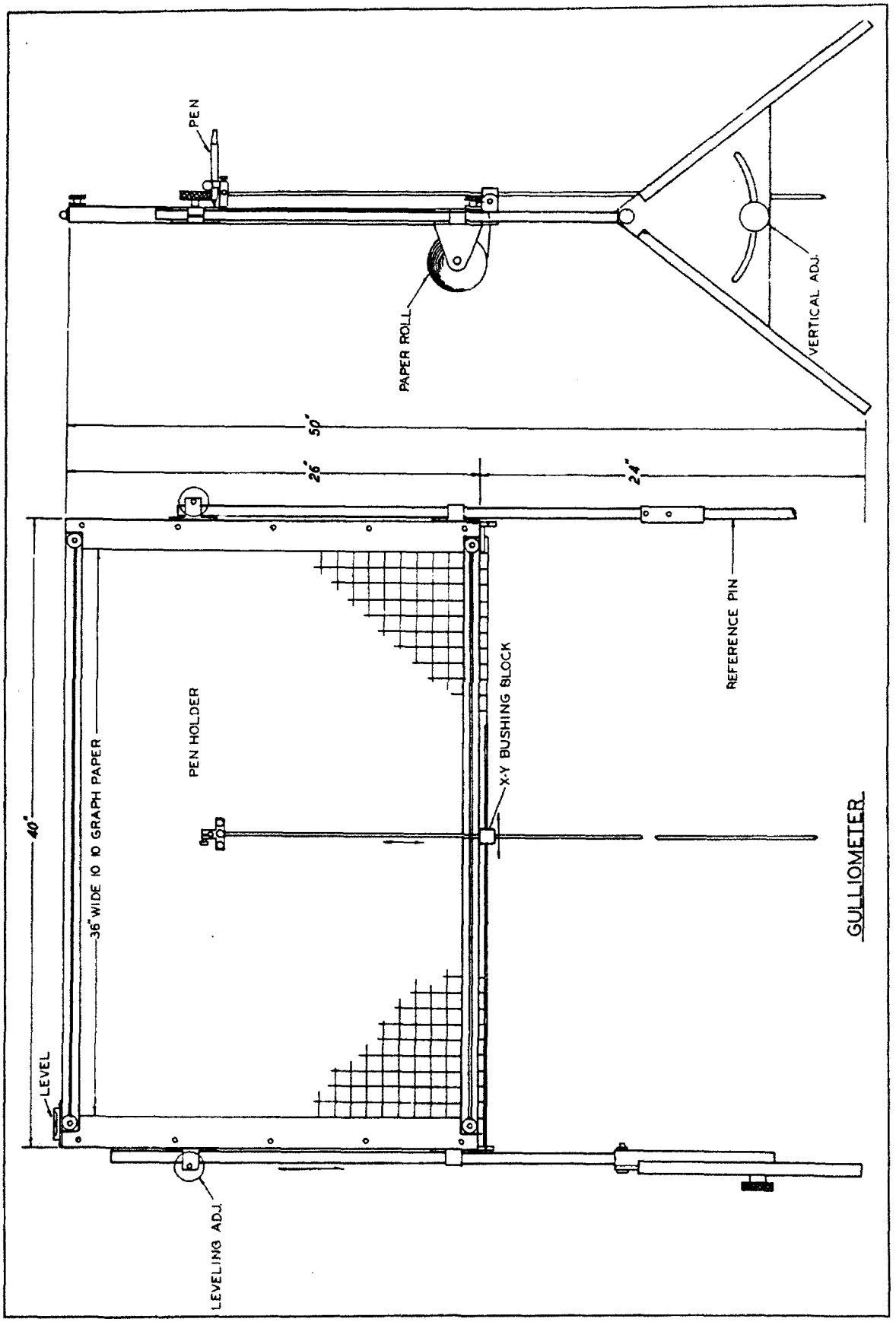
Bt3 - 14 to 19 inches; yellowish brown (10YR5/) silt loam; moderate fine and medium subangular blocky structure; firm; few fine roots patchy clay films on faces of peds; clay film in pores and root channels; very strongly acid; clear irregular boundary.

Bx1 - 19 to 33 inches; yellowish brown (10YR5/4) silt loam; many medium distinct light brownish gray (10YR6/2) and common medium faint strong brown (7.5YR5/6) mottles; weak coarse prismatic parting to fine and medium subangular blocky structure; firm compact and brittle; few fine roots between prisms; many fine voids; patchy clay films on faces of peds; common fine black and brown concretions; very strongly acid; gradual wavy boundary.

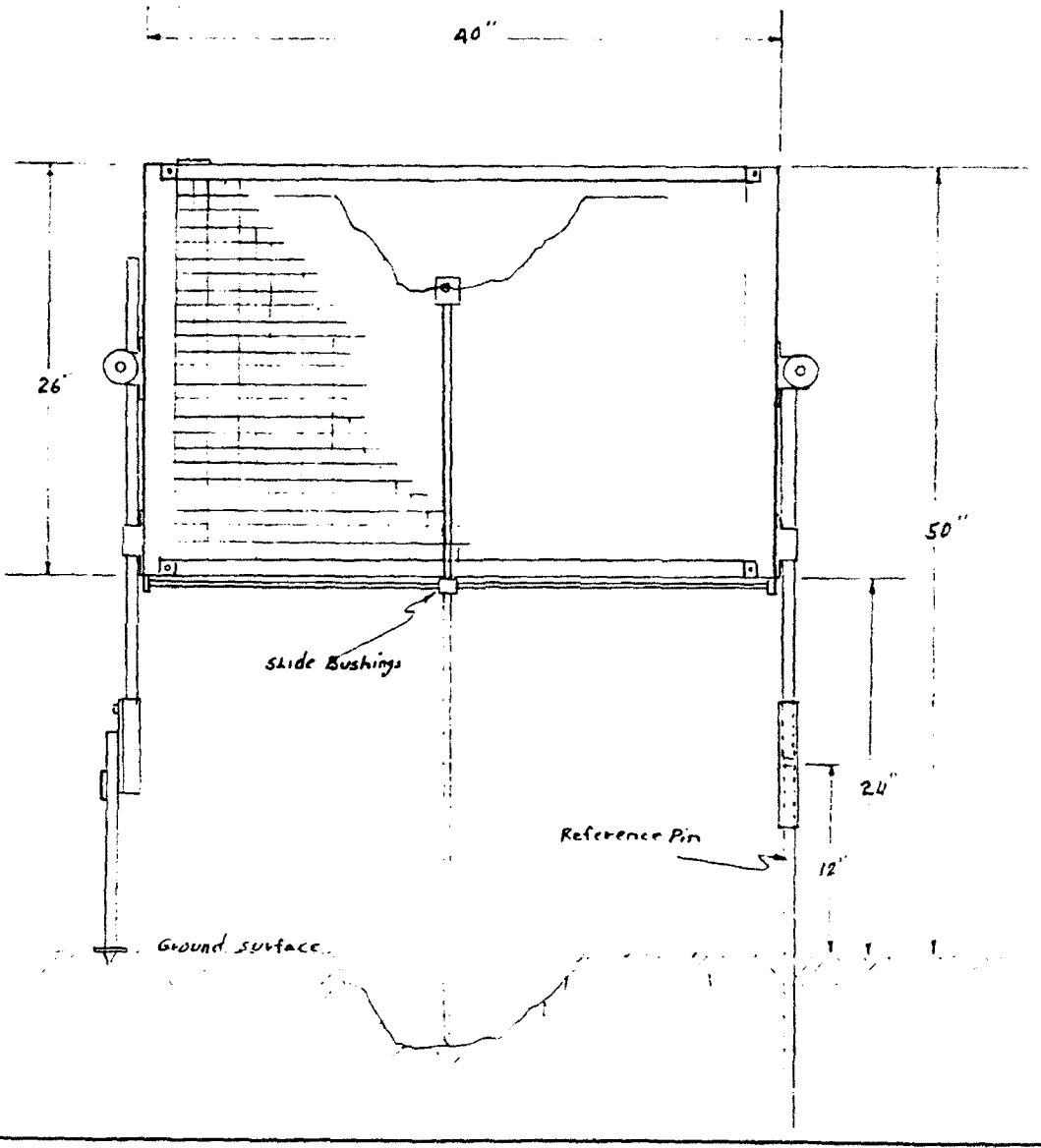
2Bx1 - 33 to 43 inches; mottled yellowish brown (10YR5/4) light brownish gray (10YR6/5), strong brown (7.5YR5/6) silt loam containing noticeable sand; moderate coarse prismatic parting to moderate fine and medium subangular and angular blocky structure; firm; compact and brittle. Many fine pores; light brownish gray silt between prisms; patchy clay films on faces of peds and lining pores. Very strongly acid. Clear wavy boundary. (Perch water in this horizon).

2Bx2 - 43 to 62 inches; mottled yellowish brown (10YR5/4) light brownish gray (10YR6/2) yellowish red (5YR4/6) clay loam weak coarse prismatic parting to moderate medium subangular blocky structure; firm compact and brittle; many fine voids; thin patchy clay films on faces of peds; few block concretions; very strongly acid.

Appendix C
Gulliometer Drawings

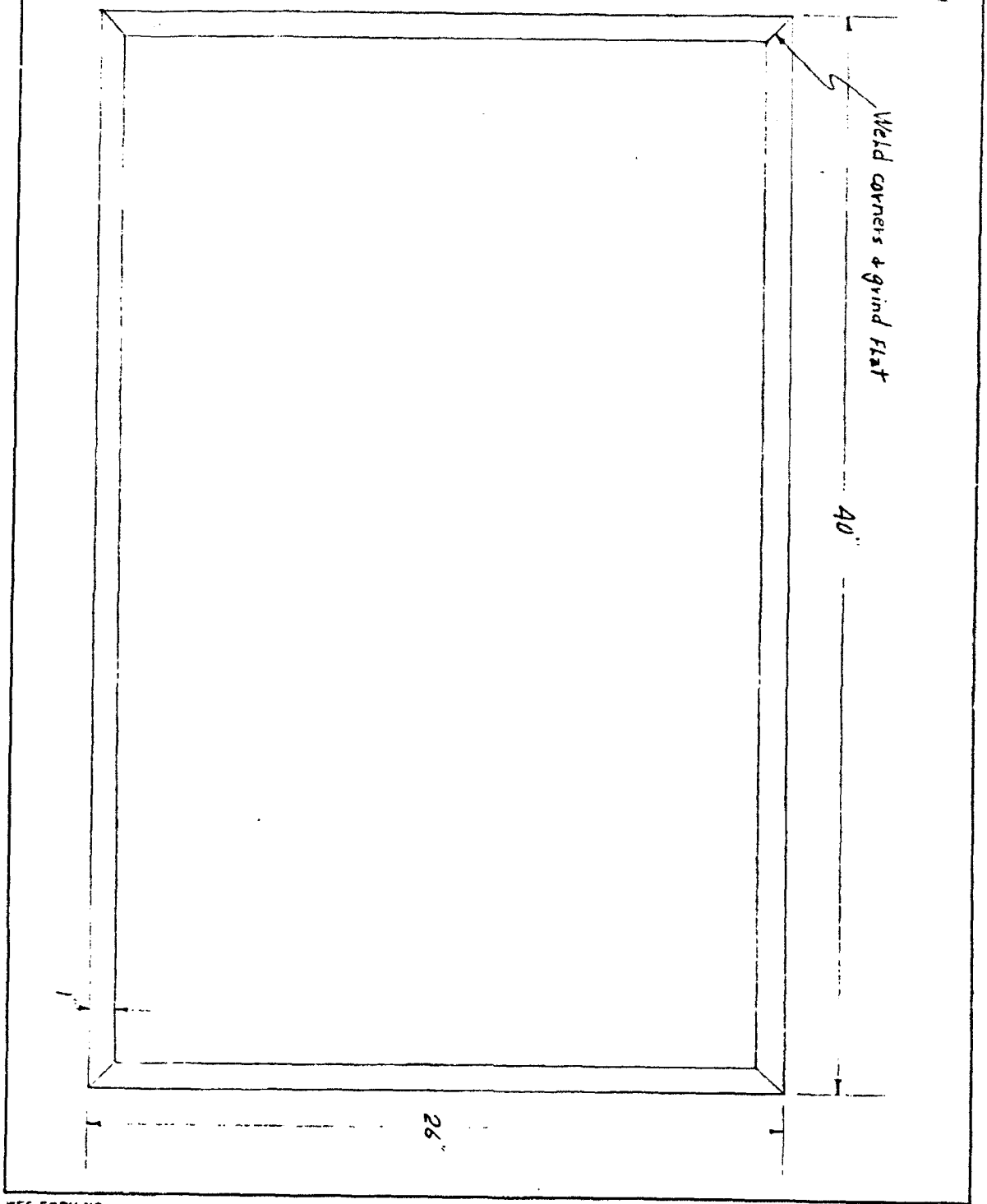

PEN
PAPER ROLL
VERTICAL ADJ.
50"
26"
24"
40"
36" WIDE IO IO GRAPH PAPER
PEN HOLDER
X-Y BUSHING BLOCK
REFERENCE PIN
LEVEL
LEVELING ADJ.
GULLIOMETER

SUBJECT:	COMPUTED BY:	DATE:	FILE NO.
GULLY MEASURING DEVICE "GULLIOMETER"	R.F. ANDERSON	2/83	1/11
	CHECKED BY: LM SMITH	DATE:	SHEET NO.



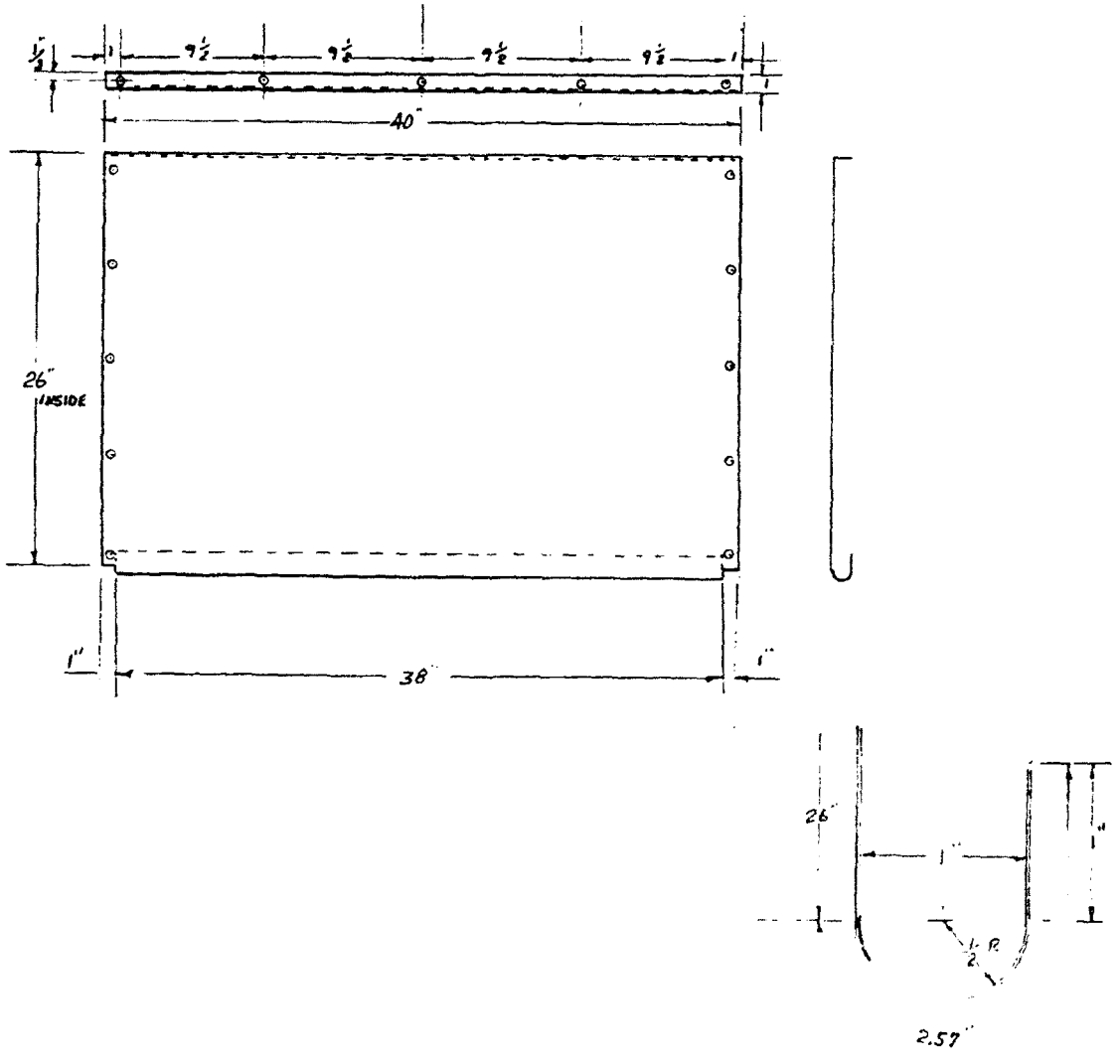
WES FORM NO. 1253
REV OCT 1968

SUBJECT:	COMPUTED BY: RFA	DATE: 2/83	FILE NO. 2/11
Gulliometer Main Frame 1"x1" Aluminum Tube	CHECKED BY: LMS	DATE:	SHEET NO



WES FORM NO. 1253
REV OCT 1968

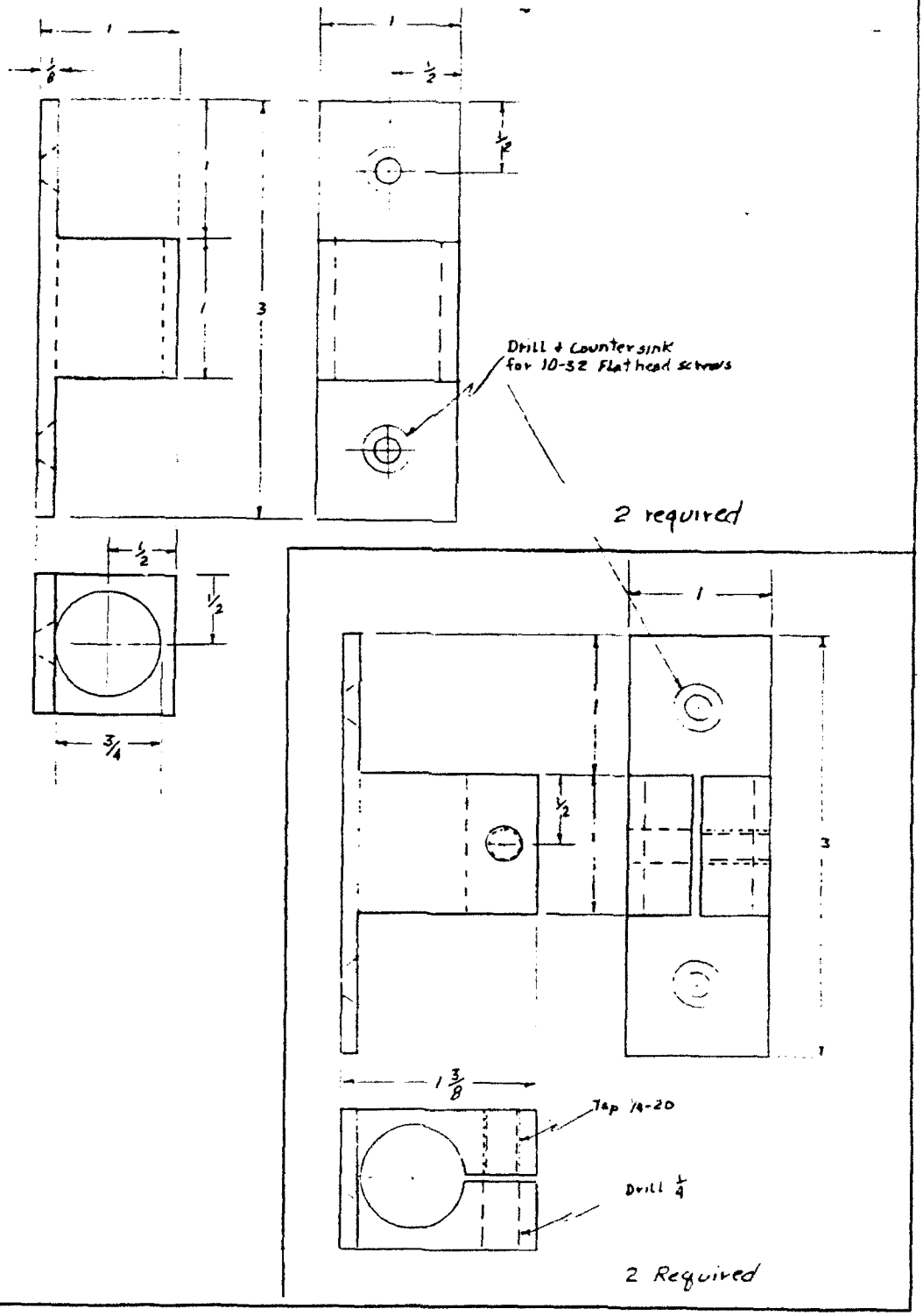
SUBJECT:	COMPUTED BY: RFA	DATE: 2/83	FILE NO. 3/11
Main Frame Cover plate	CHECKED BY: LMS	DATE:	SHEET NO.



22 gage Aluminum

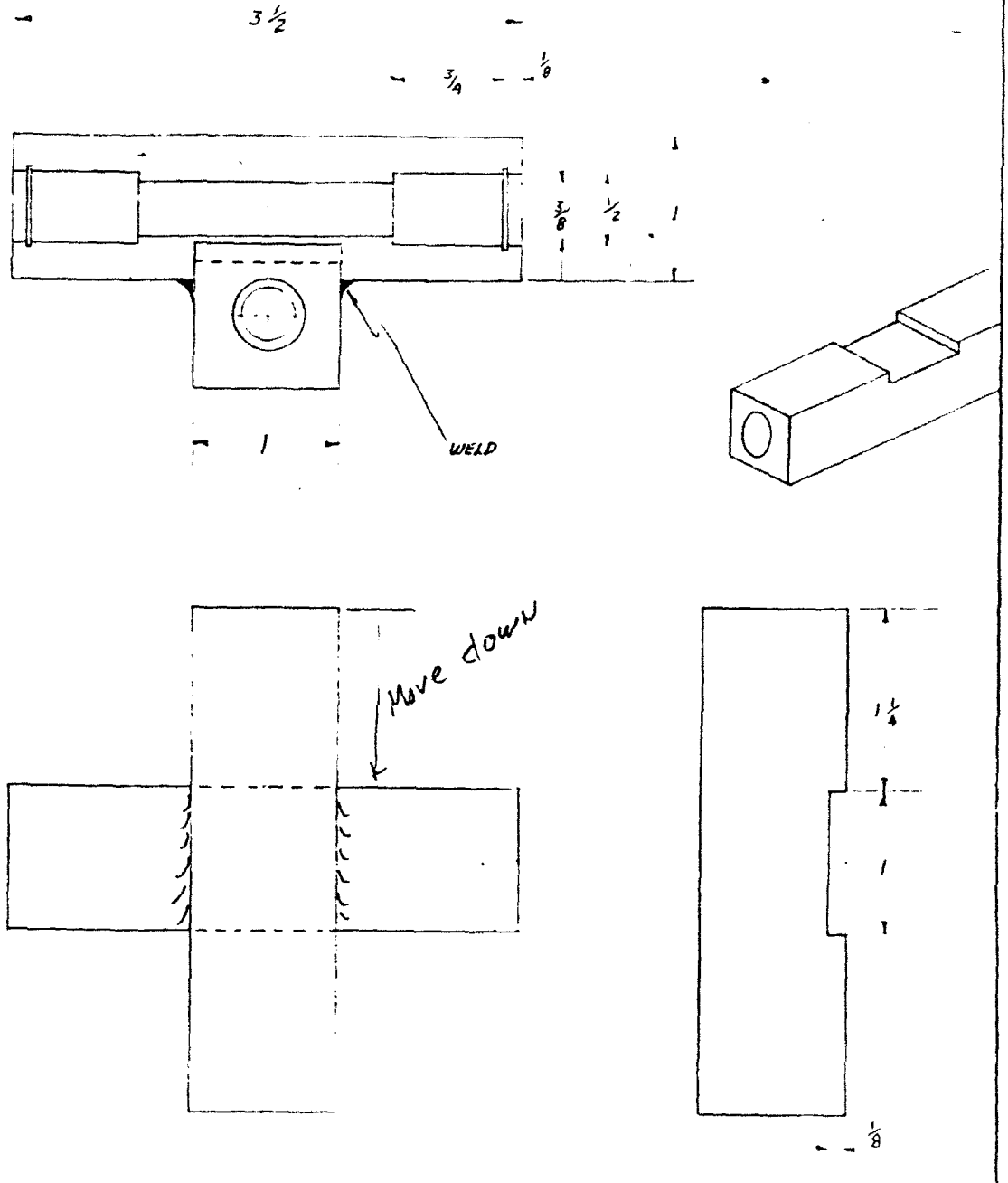
WES FORM NO. 1253
REV OCT 1968

SUBJECT: 3/4" Rod Clamps Aluminum	COMPUTED BY: RFA CHECKED BY: LMS	DATE: 2/83 DATE:	FILE NO. 4/11 SHEET NO.



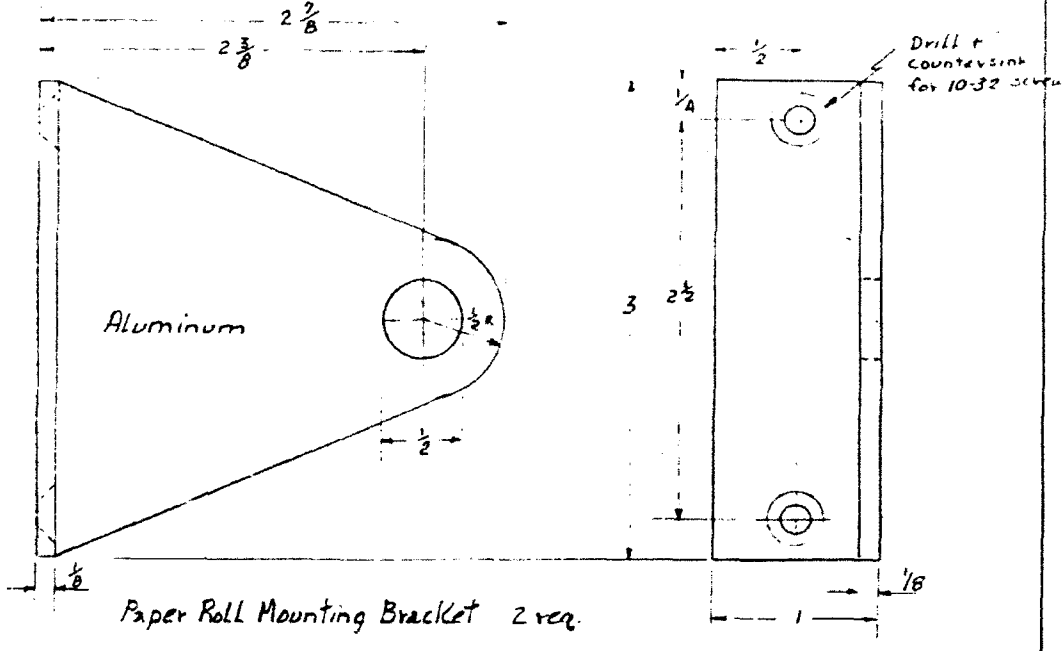
WES FORM NO. 1253
REV OCT 1968

SUBJECT: Ball Bushing Block	COMPUTED BY: RFA CHECKED BY: LMS	DATE: 2/83 DATE:	FILE NO. 5/11 SHEET NO.

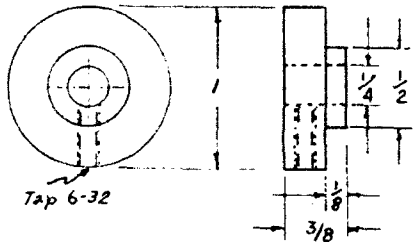


WES FORM NO. 1253
REV OCT 1968

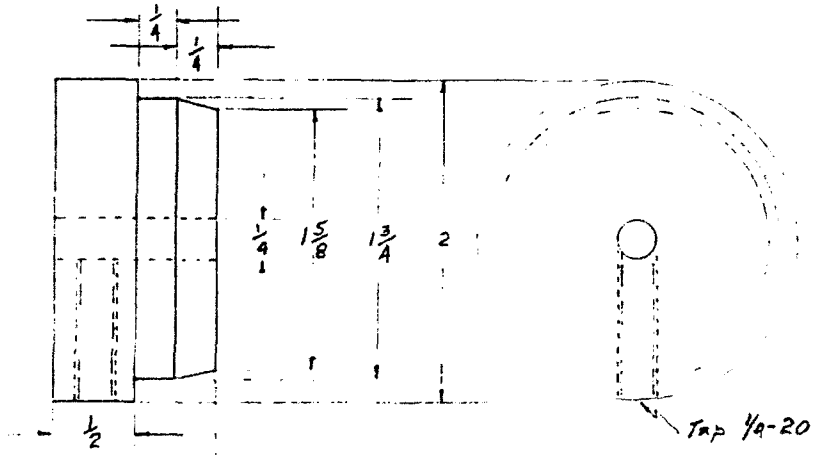
SUBJECT:	COMPUTED BY: RFA CHECKED BY: LMS	DATE: 2/83 DATE:	FILE NO. 6/11 SHEET NO.



Paper Roll Mounting Bracket 2 req.



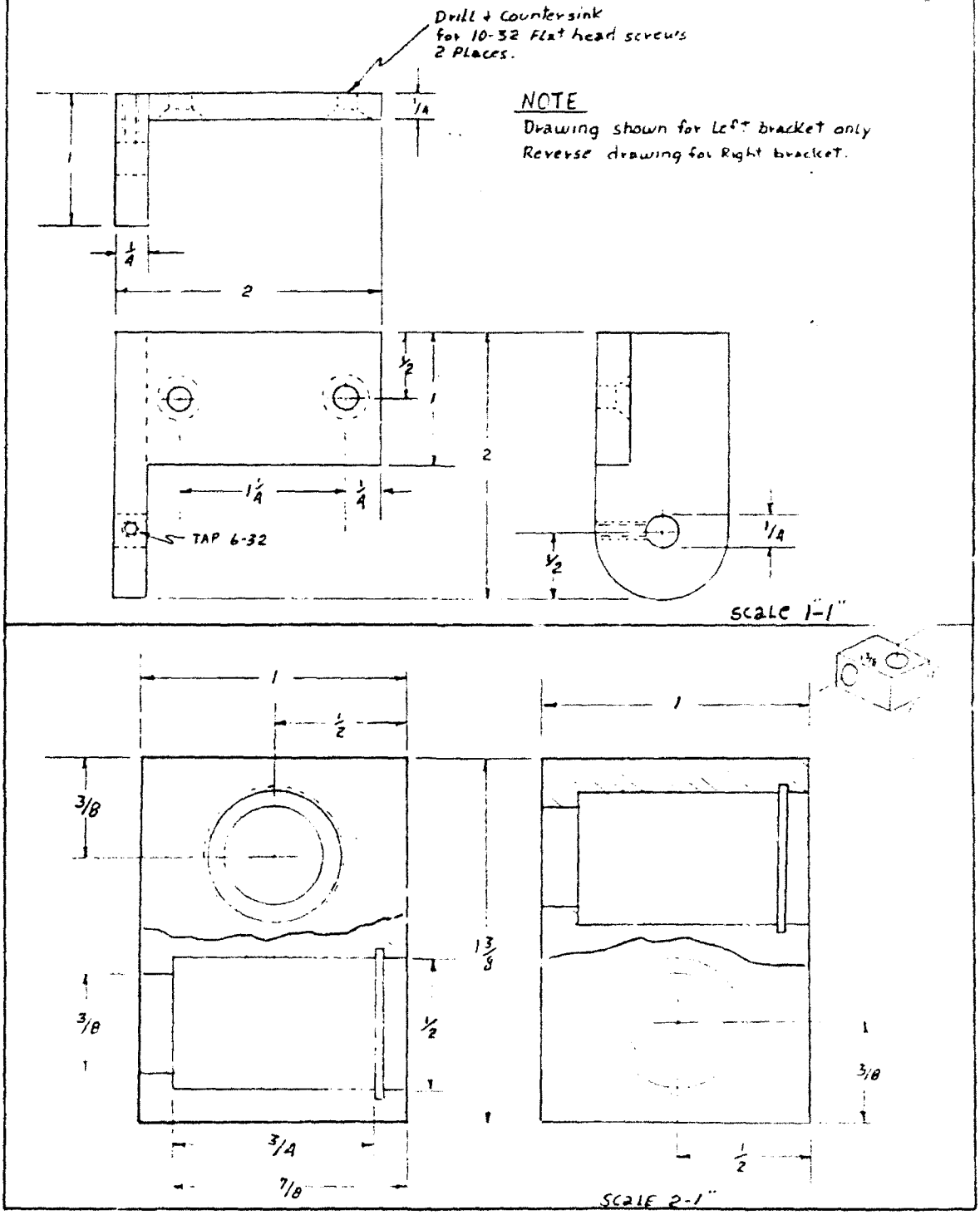
Rod Bushing 2 Req.
Aluminum



Paper Roll end Caps. 2 req.
Aluminum

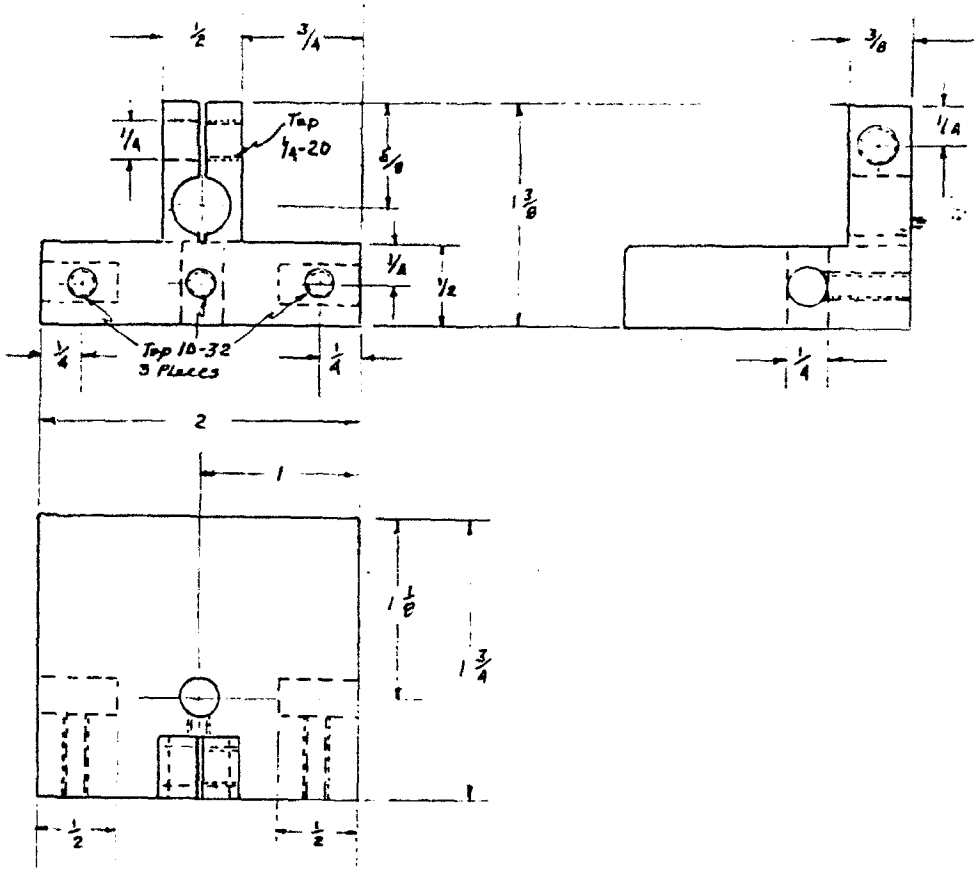
WES FORM NO. 1253
REV OCT 1968

SUBJECT: Bushing Rod mounting Brackets + Ball Bushing Block	COMPUTED BY: RFA CHECKED BY: LMS	DATE: 2/83 DATE	FILE NO. 7/11 SHEET NO.



WES FORM NO. 1253
REV OCT 1968

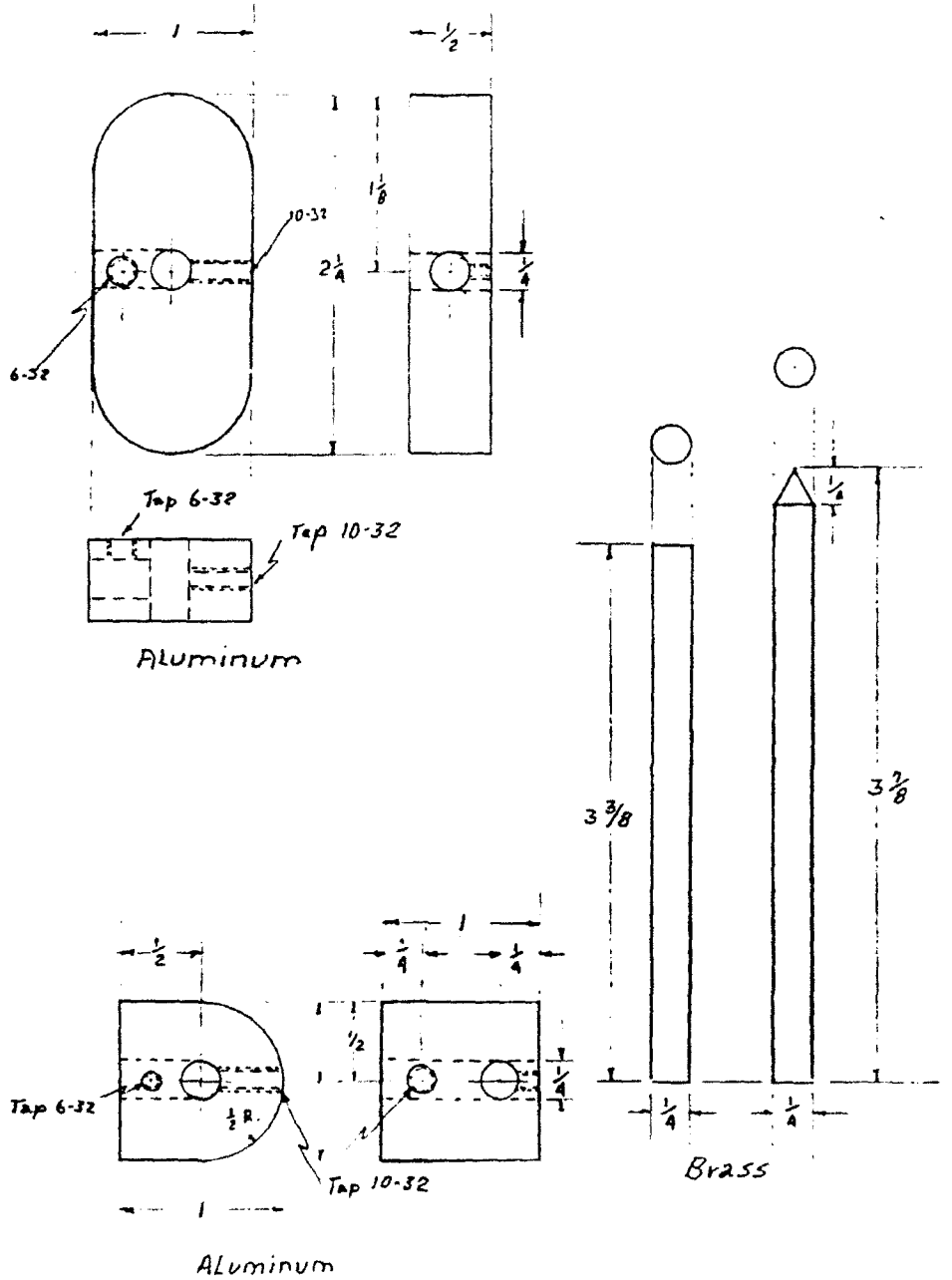
SUBJECT:	COMPUTED BY: RFA CHECKED BY: LMS	DATE: 2/83 DATE:	FILE NO. 8/11 SHEET NO.



Pen Holder
Aluminum

WES FORM NO. 1253
REV OCT 1968

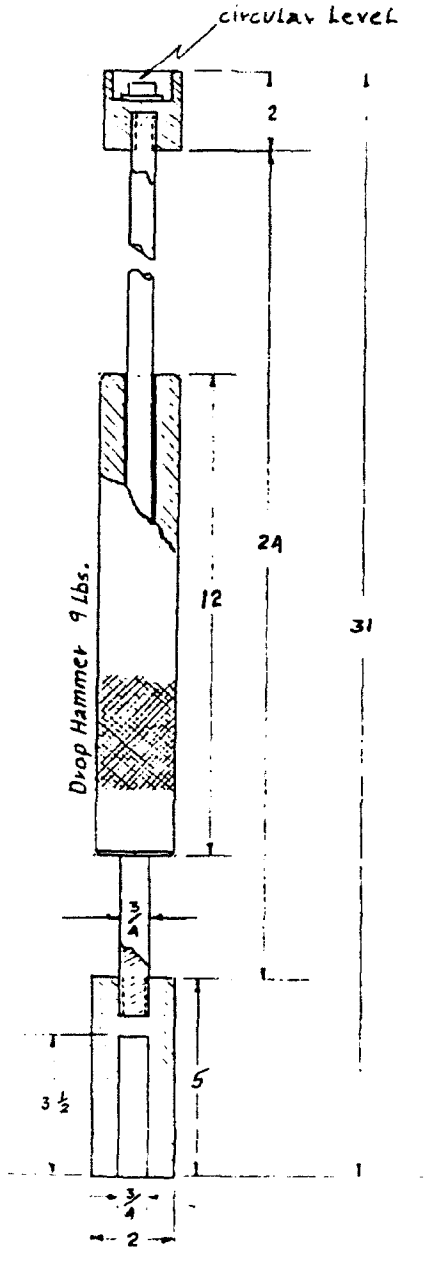
SUBJECT:	COMPUTED BY: RFA	DATE: 2/83	FILE NO. 9/11
	CHECKED BY: LMS	DATE:	SHEET NO.



Undercut Extender Parts

WES FORM NO. 1253
REV OCT 1968

SUBJECT:	COMPUTED BY: RFA	DATE: 2/83	FILE NO. 10/11
	CHECKED BY: LMS	DATE:	SHEET NO.

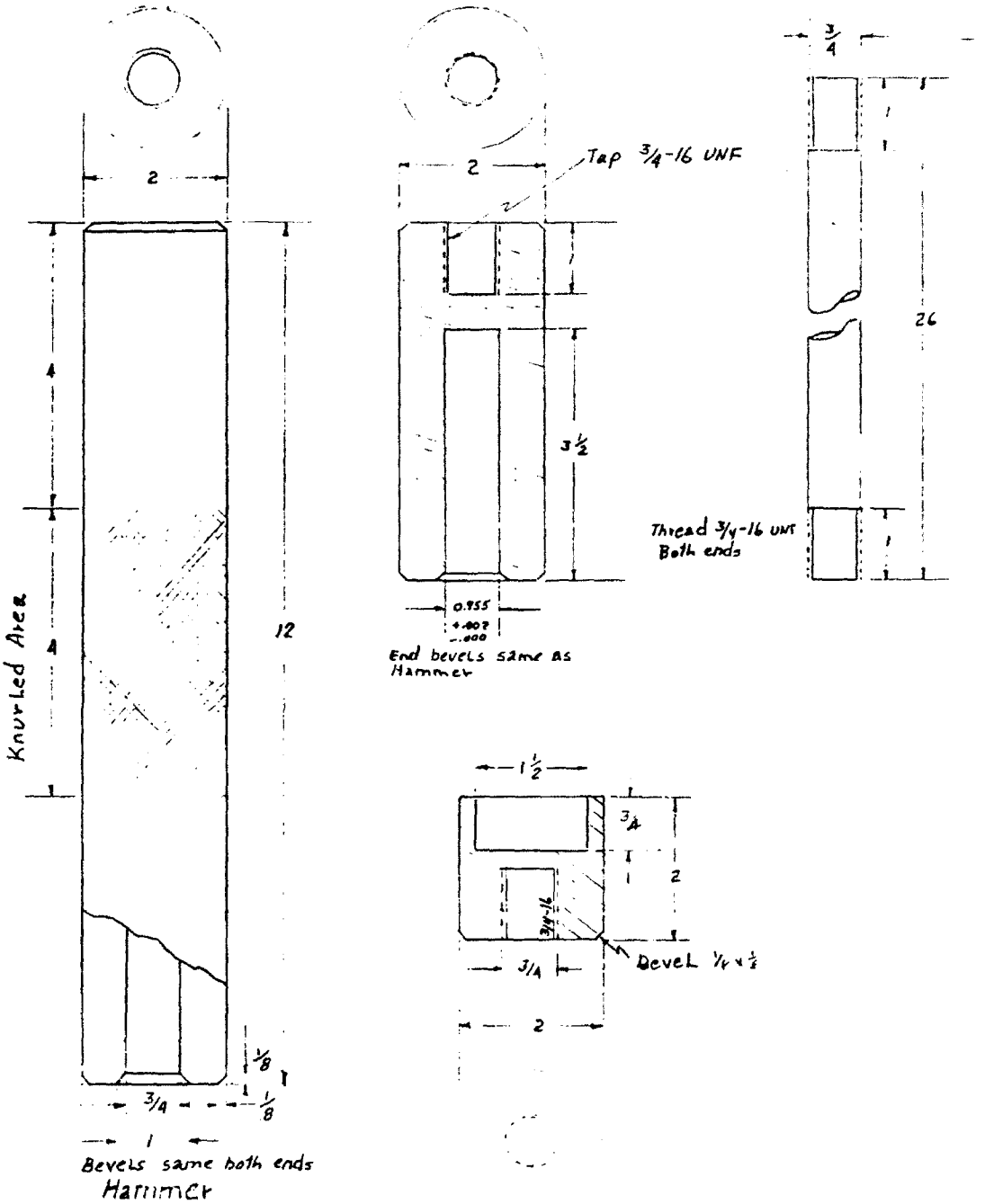


Total weight Aprox. 17 Lbs.

Reference Pin Driver

WES FORM NO. 1253
REV OCT 1968

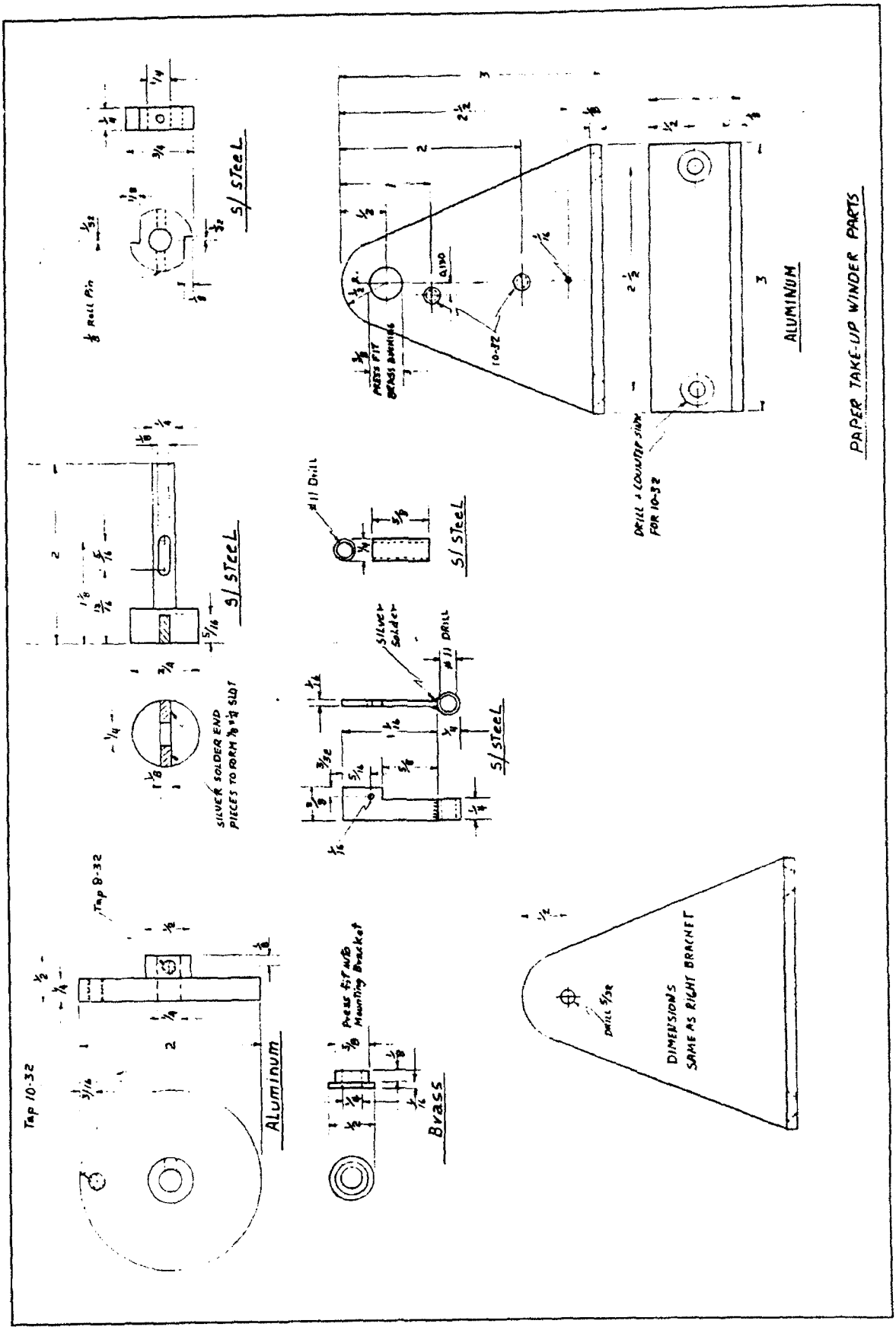
SUBJECT:	COMPUTED BY: RFA	DATE: 2/83	FILE NO. 11/11
GULLIOMETER	CHECKED BY: LMS	DATE:	SHEET NO.



Reference Pin Driver

WES FORM NO. 1253
REV OCT 1968

Gulliometer Paper Take-up winder


PAPER TAKE-UP WINDER PARTS
ALUMINUM
DRILL & COUNTER SINK FOR 10-32
10-32
DRILL 5/32
DIMENSIONS SAME AS RIGHT BRACKET
S/STEEL
SILVER SOLDER END PIECES TO FORM 1/8 x 1/4 SLOT
#11 DRILL
SILVER SOLDER
Tap 10-32
Tap 8-32
Aluminum
Brass

Appendix D
Ephemeral Gully Data

EPHEMERAL GULLIES
SITE-1, GULLY-A, CYCLE-1

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
1-A-01	03/10/83	81.49	24.59	25.22	28.34	3.23	6.43	2.88	0.00	0.00
1-A-02	03/10/83	107.44	23.35	24.30	29.07	4.42	6.64	3.70	5.10	3.35
1-A-03	03/10/83	80.40	29.52	29.45	25.78	2.73	4.66	3.12	15.80	10.32
1-A-04	03/10/83	261.65	29.16	32.10	47.70	8.15	12.57	5.49	42.70	42.27
1-A-05	03/10/83	263.05	33.95	37.52	47.90	7.01	10.46	5.49	53.40	61.76
1-A-06	03/10/83	175.26	32.71	34.09	39.20	5.14	7.77	4.47	60.90	73.18
1-A-07	03/10/83	132.46	32.28	32.30	34.50	4.09	9.25	3.84	81.30	94.97
1-A-08	03/10/83	151.74	33.13	33.87	38.28	4.48	6.83	3.96	89.90	103.46
1-A-09	03/10/83	82.44	33.76	34.63	28.23	2.38	5.25	2.92	100.60	112.17
1-A-10	03/10/83	378.11	30.11	33.31	55.05	11.35	15.69	6.87	124.00	149.59
1-A-11	03/10/83	272.08	33.16	34.74	47.61	7.83	12.84	5.71	133.00	169.91
1-A-12	03/10/83	272.87	33.74	35.20	51.87	7.75	14.85	5.26	146.10	194.70
1-A-13	03/10/83	204.95	32.44	35.15	47.90	5.83	10.80	4.28	154.30	208.30
1-A-END	03/10/83	204.95							173.10	235.05
1-A-01	04/18/83	82.63	24.84	24.59	29.08	3.36	6.17	2.84	0.00	0.00
1-A-02	04/18/83	110.40	25.73	26.22	28.88	4.21	6.60	3.82	5.10	3.42
1-A-03	04/18/83	76.32	26.11	26.59	24.30	2.87	4.47	3.14	15.80	10.36
1-A-04	04/18/83	265.10	31.04	33.26	44.02	7.97	12.17	6.02	42.70	42.25
1-A-05	04/18/83	227.05	33.07	35.53	42.48	6.39	9.26	5.34	53.40	60.53
1-A-06	04/18/83	172.53	33.63	35.21	38.51	4.90	7.40	4.48	60.90	70.94
1-A-07	04/18/83	130.70	33.94	32.20	33.31	4.06	9.00	3.93	81.30	92.42
1-A-08	04/18/83	177.02	35.42	35.83	40.74	4.94	7.57	4.35	89.90	101.61
1-A-09	04/18/83	95.53	33.88	34.24	26.61	2.79	5.60	3.59	100.60	111.73
1-A-10	04/18/83	400.43	31.95	36.83	57.44	10.87	17.07	6.97	124.00	152.03
1-A-11	04/18/83	256.84	34.47	34.89	46.62	7.36	11.47	5.51	133.00	172.57
1-A-12	04/18/83	311.10	35.18	34.86	56.13	8.92	16.15	5.54	146.10	198.40
1-A-13	04/18/83	197.89	30.51	32.28	43.60	6.13	10.54	4.54	154.30	212.89
1-A-END	04/18/83	197.89							173.10	238.72

EPHEMERAL GULLIES
SITE-1, GULLY-B, CYCLE-1

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
1-B-01	03/10/83	91.13	29.83	31.31	31.28	2.91	5.79	2.91	0.00	0.00
1-B-02	03/10/83	43.48	18.89	20.50	22.05	2.12	3.97	1.97	8.80	4.11
1-B-03	03/10/83	106.83	31.95	34.02	34.90	3.14	5.81	3.06	19.10	9.49
1-B-04	03/10/83	166.03	24.21	24.85	36.17	6.68	12.23	4.59	30.10	19.91
1-B-05	03/10/83	313.42	33.45	34.70	56.31	9.03	16.79	5.57	41.10	38.23
1-B-06	03/10/83	272.92	33.13	35.35	45.43	7.72	12.18	6.01	49.90	56.14
1-B-07	03/10/83	238.38	30.35	31.99	51.20	7.45	14.58	4.66	57.00	68.75
1-B-08	03/10/83	251.91	33.40	35.13	47.86	7.17	12.81	5.26	62.10	77.43
1-B-09	03/10/83	114.62	24.93	26.96	31.32	4.25	7.31	3.66	69.70	87.10
1-B-END	03/10/83	114.62							93.20	105.80
1-B-01	04/18/83	80.14	29.01	30.47	29.35	2.63	4.64	2.73	0.00	0.00
1-B-02	04/18/83	49.56	23.95	24.41	27.43	2.03	3.96	1.81	8.80	3.96
1-B-03	04/18/83	94.41	28.53	30.55	28.24	3.09	5.24	3.34	19.10	9.11
1-B-04	04/18/83	176.62	28.09	28.07	36.89	6.29	12.31	4.79	30.10	19.47
1-B-05	04/18/83	321.45	32.93	36.48	58.10	8.81	16.04	5.53	41.10	38.50
1-B-06	04/18/83	276.24	32.90	35.96	46.31	7.68	11.60	5.97	49.90	56.76
1-B-07	04/18/83	262.08	28.13	31.92	52.07	8.21	14.68	5.03	57.00	70.03
1-B-08	04/18/83	257.89	35.03	37.00	49.85	6.97	11.89	5.17	62.10	79.23
1-B-09	04/18/83	106.70	28.52	28.37	31.77	3.76	6.54	3.36	69.70	88.85
1-B-END	04/18/83	106.70							93.20	106.27

EPHEMERAL GULLIES
SITE-1, GULLY-C, CYCLE-1

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
1-C-01	03/10/83	64.07	20.79	18.15	27.61	3.53	7.45	2.32	0.00	0.00
1-C-02	03/10/83	96.38	23.74	23.85	31.09	4.04	8.18	3.10	8.10	4.51
1-C-03	03/10/83	153.75	27.40	27.80	39.24	5.53	9.98	3.92	14.10	9.72
1-C-04	03/10/83	160.23	28.17	29.78	43.55	5.38	9.06	3.68	24.70	21.28
1-C-05	03/10/83	170.27	33.09	34.46	47.42	4.94	10.69	3.59	33.50	31.38
1-C-06	03/10/83	147.98	24.55	26.85	35.52	5.51	9.22	4.17	44.90	43.98
1-C-07	03/10/83	122.50	33.76	35.40	38.78	3.46	6.79	3.16	58.50	56.75
1-C-08	03/10/83	184.38	27.54	29.03	41.93	6.35	10.43	4.40	67.10	65.92
1-C-09	03/10/83	228.13	33.11	36.61	42.18	6.23	9.88	5.41	77.40	80.67
1-C-10	03/10/83	204.86	33.61	33.86	49.50	6.05	10.88	4.14	85.60	93.00
1-C-11	03/10/83	201.14	33.71	33.91	41.81	5.93	11.53	4.81	96.00	107.66
1-C-12	03/10/83	187.73	30.15	29.79	40.67	6.30	10.99	4.62	105.10	119.95
1-C-13	03/10/83	102.37	28.57	28.51	29.26	3.59	5.67	3.50	111.40	126.30
1-C-END	03/10/83	102.37							123.50	134.90
1-C-01	04/18/83	63.57	21.80	21.04	27.37	3.02	6.96	2.32	0.00	0.00
1-C-02	04/18/83	100.52	23.65	24.81	30.28	4.05	7.93	3.32	8.10	4.61
1-C-03	04/18/83	165.55	27.30	28.59	42.08	5.79	9.70	3.93	14.10	10.16
1-C-04	04/18/83	156.32	27.90	30.91	39.98	5.38	8.96	4.16	24.70	22.37
1-C-05	04/18/83	173.62	34.03	34.79	49.25	4.99	10.53	3.53	33.50	32.76
1-C-06	04/18/83	143.84	25.17	27.13	36.28	5.30	8.79	3.96	44.90	45.33
1-C-07	04/18/83	158.94	35.07	36.04	42.28	4.41	7.76	3.76	58.50	59.63
1-C-08	04/18/83	225.69	35.11	35.93	52.52	6.28	11.50	4.30	67.10	71.12
1-C-09	04/18/83	220.36	34.06	36.72	42.68	6.00	9.66	5.16	77.40	87.07
1-C-10	04/18/83	208.16	34.03	34.63	50.16	6.01	11.10	4.15	85.60	99.27
1-C-11	04/18/83	232.90	33.80	35.55	51.63	6.55	11.97	4.51	96.00	115.19
1-C-12	04/18/83	192.67	31.51	31.95	42.19	6.03	10.78	4.57	105.10	128.64
1-C-13	04/18/83	105.20	30.10	30.94	28.70	3.40	5.59	3.67	111.40	135.16
1-C-END	04/18/83	105.20							123.50	144.00

EPHEMERAL GULLIES
SITE-1, GULLY-D, CYCLE-1

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
1-D-01	03/10/83	125.58	24.93	25.16	34.89	4.99	9.48	3.60	0.00	0.00
1-D-02	03/10/83	165.57	30.99	30.94	36.85	5.35	10.09	4.49	7.30	7.38
1-D-03	03/10/83	197.98	30.23	30.98	42.24	6.39	13.26	4.69	14.30	16.22
1-D-04	03/10/83	223.07	29.02	29.90	45.44	7.46	13.96	4.91	20.80	25.72
1-D-05	03/10/83	252.42	31.96	32.27	49.20	7.82	14.75	5.13	27.80	37.28
1-D-06	03/10/83	220.36	33.77	33.43	48.25	6.59	12.15	4.57	33.30	46.31
1-D-07	03/10/83	322.74	33.43	34.44	50.80	9.37	14.54	6.35	40.80	60.45
1-D-08	03/10/83	304.03	34.68	37.44	48.93	8.12	12.97	6.21	45.50	70.67
1-D-09	03/10/83	244.26	32.21	32.91	42.81	7.42	9.41	5.71	50.60	80.38
1-D-10	03/10/83	209.69	35.24	36.85	44.68	5.69	7.77	4.69	56.90	90.31
1-D-END	03/10/83	209.69							67.00	105.02
1-D-01	04/18/83	122.27	26.49	27.05	33.66	4.52	8.91	3.63	0.00	0.00
1-D-02	04/18/83	166.76	31.36	32.13	36.06	5.16	9.73	4.62	7.30	7.33
1-D-03	04/18/83	222.74	31.47	30.63	57.45	7.27	13.30	3.88	14.30	16.79
1-D-04	04/18/83	223.16	28.97	31.16	46.26	7.16	12.96	4.82	20.80	26.86
1-D-05	04/18/83	250.50	3.84	33.89	50.78	7.39	14.25	4.93	27.80	38.37
1-D-06	04/18/83	238.55	32.88	35.13	49.75	6.79	11.69	4.79	33.30	47.72
1-D-07	04/18/83	301.29	33.47	35.07	51.36	8.59	13.84	5.86	40.80	61.77
1-D-08	04/18/83	341.57	35.52	37.24	52.66	9.17	12.96	6.49	45.50	72.26
1-D-09	04/18/83	245.02	35.99	26.95	43.08	6.63	8.78	5.69	50.60	82.65
1-D-10	04/18/83	164.40	35.50	35.45	43.14	4.51	5.92	3.81	56.90	91.61
1-D-END	04/18/83	164.40							67.00	103.15

EPHEMERAL GULLIES
SITE-2, GULLY-A, CYCLE-1

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
2-A-01	03/12/83	33.89	14.56	13.61	18.48	2.49	4.66	1.83	0.00	0.00
2-A-02	03/12/83	164.81	30.73	32.18	44.80	5.12	10.22	3.68	4.40	3.04
2-A-03	03/12/83	229.76	33.42	34.19	48.52	6.72	10.39	4.74	8.80	9.07
2-A-04	03/12/83	111.12	27.45	27.50	32.37	4.04	9.52	3.43	10.80	11.43
2-A-05	03/12/83	99.09	30.70	32.27	27.37	3.07	6.44	3.62	14.00	13.77
2-A-06	03/12/83	65.58	21.94	21.29	27.22	3.08	5.95	2.41	16.20	15.03
2-A-07	03/12/83	29.99	18.91	19.10	20.37	1.57	2.30	1.47	18.90	15.92
2-A-08	03/12/83	37.02	24.06	24.19	25.41	1.53	3.23	1.46	28.10	18.06
2-A-09	03/12/83	63.23	30.42	31.30	27.09	2.02	4.40	2.33	45.90	24.26
2-A-END	03/12/83	63.23							47.20	24.83
2-A-01	04/20/83	19.00	34.59	27.94	17.08	0.68	3.78	1.11	0.00	0.00
2-A-02	04/20/83	175.01	34.57	34.18	40.94	5.12	10.95	4.27	4.40	2.96
2-A-03	04/20/83	274.26	34.53	37.21	51.73	7.37	13.22	5.30	8.80	9.83
2-A-04	04/20/83	177.43	34.37	35.27	48.00	5.03	8.83	3.70	10.80	12.96
2-A-05	04/20/83	111.06	31.89	32.47	28.00	3.42	7.23	3.97	14.00	16.17
2-A-06	04/20/83	54.12	25.89	25.52	22.11	2.12	5.22	2.45	16.20	17.43
2-A-07	04/20/83	39.50	20.31	20.89	23.94	1.89	3.13	1.65	18.90	18.31
2-A-08	04/20/83	30.00	23.25	23.80	24.31	1.26	2.33	1.23	28.10	20.53
2-A-09	04/20/83	58.23	32.86	33.08	29.62	1.76	4.02	1.97	45.90	25.97
2-A-END	04/20/83	58.23							47.20	26.50

EPHEMERAL GULLIES
SITE-2, GULLY-B, CYCLE-1

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
2-B-01	03/12/83	57.95	26.33	26.82	30.33	2.16	5.34	1.91	0.00	0.00
2-B-02	03/12/83	96.00	30.73	31.89	33.93	3.01	6.59	2.83	6.20	3.31
2-B-03	03/12/83	109.54	28.75	28.01	37.02	3.91	7.04	2.96	10.60	6.46
2-B-04	03/12/83	112.24	29.52	29.61	34.46	3.79	6.80	3.26	16.90	11.31
2-B-05	03/12/83	78.27	32.64	33.02	35.90	2.37	4.70	2.18	25.30	16.86
2-B-06	03/12/83	57.01	31.05	32.02	33.22	1.78	3.77	1.72	28.30	18.27
2-B-07	03/12/83	57.11	24.05	23.40	24.38	2.44	5.04	2.34	48.10	26.12
2-B-08	03/12/83	128.11	22.30	23.29	29.22	5.50	9.15	4.38	52.60	29.02
2-B-09	03/12/83	187.05	34.94	35.83	40.50	5.22	10.64	4.62	59.20	36.24
2-B-10	03/12/83	159.57	33.45	34.84	34.19	4.58	8.58	4.67	67.80	46.59
2-B-11	03/12/83	287.04	34.87	35.92	50.83	7.99	13.34	5.65	74.00	56.21
2-B-12	03/12/83	201.35	34.84	35.13	42.10	5.73	9.39	4.78	81.30	68.58
2-B-13	03/12/83	127.31	34.71	35.66	39.78	3.57	6.64	3.20	87.80	76.00
2-B-14	03/12/83	86.66	34.93	35.37	38.62	2.45	4.62	2.24	95.40	81.65
2-B-15	03/12/83	71.95	34.49	34.92	38.10	2.06	3.88	1.89	104.70	86.77
2-B-16	03/12/83	202.95	34.12	34.45	44.69	5.89	9.99	4.54	112.00	93.74
2-B-17	03/12/83	77.06	30.56	30.57	25.85	2.52	5.36	2.98	121.80	103.26
2-B-18	03/12/83	46.45	31.14	31.17	20.03	1.49	2.75	2.32	129.30	106.48
2-B-END	03/12/83	46.45							137.80	109.23
2-B-01	04/20/83	70.65	34.23	34.46	38.96	2.05	5.77	1.81	0.00	0.00
2-B-02	04/20/83	89.15	32.25	32.53	28.87	2.74	6.04	3.09	6.20	3.44
2-B-03	04/20/83	112.70	27.50	27.96	36.19	4.03	6.81	3.11	10.60	6.53
2-B-04	04/20/83	118.03	30.40	30.89	36.60	3.82	7.37	3.22	16.90	11.57
2-B-05	04/20/83	70.48	33.63	34.04	35.95	2.07	3.61	1.96	25.30	17.07
2-B-06	04/20/83	50.24	31.74	32.20	33.16	1.56	3.46	1.52	28.30	18.33
2-B-07	04/20/83	52.72	30.52	29.12	25.39	1.81	4.69	2.08	48.10	25.41
2-B-08	04/20/83	223.28	31.25	31.94	37.74	6.99	11.67	5.92	52.60	29.72
2-B-09	04/20/83	194.09	32.94	32.67	43.78	5.94	10.52	4.43	59.20	39.29
2-B-10	04/20/83	191.23	35.30	36.28	37.94	5.27	9.55	5.04	67.80	50.79
2-B-11	04/20/83	273.43	35.19	35.32	51.08	7.74	11.58	5.35	74.00	60.80
2-B-12	04/20/83	258.17	34.71	36.98	43.64	6.98	11.03	5.92	81.30	74.27
2-B-13	04/20/83	134.58	34.79	35.23	42.32	3.82	6.80	3.18	87.80	83.14
2-B-14	04/20/83	98.30	35.09	35.10	39.77	2.80	5.40	2.47	95.40	89.29
2-B-15	04/20/83	86.53	35.30	35.60	40.00	2.43	4.34	2.16	104.70	95.26
2-B-16	04/20/83	227.79	35.16	36.85	47.53	6.18	10.79	4.79	112.00	103.23
2-B-17	04/20/83	102.10	29.27	29.08	26.78	3.51	6.59	3.81	121.80	114.45
2-B-18	04/20/83	42.82	31.36	31.95	20.21	1.34	2.71	2.12	129.30	118.23
2-B-END	04/20/83	42.82							137.80	120.75

EPHEMERAL GULLIES
SITE-2, GULLY-C, CYCLE-1

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
2-C-01	03/12/83	50.29	27.35	28.41	23.84	1.77	2.80	2.11	0.00	0.00
2-C-02	03/12/83	57.30	29.61	29.38	31.98	1.95	4.12	1.79	4.70	1.76
2-C-03	03/12/83	52.75	22.98	22.63	27.33	2.33	4.30	1.93	7.40	2.79
2-C-04	03/12/83	41.06	18.80	18.92	20.95	2.17	3.53	1.96	10.20	3.70
2-C-05	03/12/83	27.30	16.09	16.54	15.68	1.65	3.10	1.74	13.10	4.39
2-C-06	03/12/83	46.18	26.07	25.65	19.36	1.80	4.15	2.39	20.10	6.18
2-C-07	03/12/83	29.45	26.71	26.29	19.54	1.12	2.86	1.51	25.70	7.65
2-C-08	03/12/83	42.00	28.18	27.09	30.75	1.55	3.50	1.37	29.60	8.62
2-C-09	03/12/83	22.76	18.48	18.80	16.12	1.21	2.16	1.41	32.80	9.34
2-C-END	03/12/83	22.76							35.70	9.80
2-C-01	04/20/83	47.61	32.03	32.38	25.48	1.47	2.38	1.87	0.00	0.00
2-C-02	04/20/83	60.37	34.54	34.89	35.00	1.73	3.48	1.72	4.70	1.76
2-C-03	04/20/83	61.41	28.36	29.10	25.60	2.11	3.98	2.40	7.40	2.90
2-C-04	04/20/83	26.24	25.16	25.47	17.71	1.03	2.17	1.48	10.20	3.75
2-C-05	04/20/83	28.81	19.73	20.00	22.21	1.44	3.06	1.30	13.10	4.31
2-C-06	04/20/83	44.50	32.47	32.48	18.96	1.37	3.49	2.35	20.10	6.09
2-C-07	04/20/83	37.24	27.24	26.98	21.28	1.38	2.61	1.75	25.70	7.68
2-C-08	04/20/83	47.05	29.36	29.96	29.17	1.57	3.13	1.61	29.60	8.82
2-C-09	04/20/83	25.31	25.36	25.82	27.02	0.98	1.92	0.94	32.80	9.63
2-C-END	04/20/83	25.31							35.70	10.14

EPHEMERAL GULLIES
SITE-3, GULLY-A, CYCLE-1

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
3-A-01	03/08/83	97.30	18.44	19.49	30.45	4.99	9.55	3.20	5.50	1.86
3-A-02	03/08/83	77.86	27.18	27.03	28.55	2.88	5.66	2.73	11.40	5.45
3-A-03	03/08/83	70.78	22.90	23.28	27.24	3.04	5.67	2.60	17.40	8.55
3-A-04	03/08/83	55.31	27.67	27.93	27.83	1.98	4.48	1.99	22.70	10.87
3-A-05	03/08/83	86.62	22.36	22.76	31.34	3.63	7.54	2.76	31.20	15.06
3-A-06	03/08/83	67.16	22.56	22.84	27.55	2.94	5.19	2.44	38.00	18.69
3-A-END	03/08/83	67.16							43.20	21.11

EPHEMERAL GULLIES
SITE-3, GULLY-B, CYCLE-1

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
3-B-01	03/08/83	62.92	18.73	18.45	24.99	3.41	6.03	2.52	4.60	1.01
3-B-02	03/08/83	124.89	30.28	30.76	32.28	4.06	7.34	3.87	10.90	5.11
3-B-03	03/08/83	177.15	28.88	30.17	37.20	5.87	9.96	4.76	19.30	13.92
3-B-04	03/08/83	146.85	33.77	33.99	42.58	4.32	8.79	3.45	28.30	24.05
3-B-05	03/08/83	102.54	22.12	21.49	33.19	4.77	9.28	3.09	35.40	30.19
3-B-06	03/08/83	144.65	27.00	27.39	38.95	5.28	8.83	3.71	41.60	35.52
3-B-07	03/08/83	75.16	28.44	28.46	30.47	2.64	4.81	2.47	52.40	43.76
3-B-08	03/08/83	137.22	31.54	31.69	47.88	4.33	8.90	2.87	65.10	53.13
3-B-09	03/08/83	100.97	26.40	26.71	31.44	3.78	5.86	3.21	74.00	60.49
3-B-10	03/08/83	69.39	23.32	23.44	23.74	2.96	5.22	2.92	85.90	67.53
3-B-11	03/08/83	50.71	26.52	25.87	32.41	1.96	4.27	1.56	96.00	71.74
3-B-END	03/08/83	50.71							100.20	73.22

EPHEMERAL GULLIES
SITE-3, GULLY-C, CYCLE-1

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
3-C-01	03/08/83	106.61	24.06	24.17	35.49	4.41	8.84	3.00	4.50	1.67
3-C-02	03/08/83	171.64	26.02	27.68	38.50	6.20	11.23	4.46	8.40	5.43
3-C-03	03/08/83	202.48	25.46	26.33	44.17	7.69	15.19	4.58	10.00	7.51
3-C-04	03/08/83	295.49	35.16	36.84	49.51	8.02	13.61	5.97	16.30	18.40
3-C-05	03/08/83	181.79	30.87	30.60	39.26	5.94	10.07	4.63	25.40	33.48
3-C-END	03/08/83	181.79							44.00	56.96

EPHEMERAL GULLIES
SITE-3, GULLY-D, CYCLE-1

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
3-D-01	03/09/83	142.72	24.15	25.99	37.15	5.49	10.28	3.84	3.60	1.78
3-D-02	03/09/83	92.40	34.99	34.86	38.56	2.65	4.67	2.40	8.30	5.62
3-D-03	03/09/83	157.88	35.63	36.63	46.16	4.31	8.76	3.42	19.40	15.27
3-D-04	03/09/83	277.73	35.46	34.75	63.33	7.99	20.14	4.39	23.20	21.01
3-D-05	03/09/83	320.98	34.01	34.40	60.23	9.33	20.07	5.33	28.80	32.66
3-D-06	03/09/83	175.23	36.08	37.52	46.24	4.67	9.32	3.79	39.00	50.23
3-D-END	03/09/83	175.23							60.00	75.79

EPHEMERAL GULLIES
SITE-3, GULLY-E, CYCLE-1

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
3-E-01	03/09/83	63.09	23.47	23.89	25.08	2.64	5.33	2.52	2.90	0.64
3-E-02	03/09/83	69.81	22.58	23.42	23.46	2.98	5.72	2.98	7.30	2.67
3-E-03	03/09/83	141.44	33.70	34.66	40.94	4.08	7.32	3.45	14.70	8.09
3-E-04	03/09/83	165.47	30.92	30.87	35.96	5.36	11.54	4.60	20.40	14.17
3-E-05	03/09/83	194.88	35.81	36.63	43.74	5.32	8.78	4.46	26.20	21.42
3-E-06	03/09/83	116.41	31.99	32.06	39.31	3.63	7.73	2.96	32.20	27.91
3-E-07	03/09/83	95.78	33.15	34.57	30.35	2.77	4.53	3.16	37.60	31.88
3-E-08	03/09/83	108.87	34.50	35.00	35.82	3.11	5.15	3.04	41.20	34.44
3-E-09	03/09/83	90.01	32.99	32.97	35.48	2.73	4.71	2.54	47.50	38.79
3-E-10	03/09/83	82.81	31.69	30.78	36.97	2.69	5.81	2.24	53.70	42.51
3-E-END	03/09/83	82.81							59.80	46.02

EPHEMERAL GULLIES
SITE-4, GULLY-A, CYCLE-1

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
4-A-01	03/21/83	43.06	30.18	30.32	31.39	1.42	2.88	1.37	21.20	3.17
4-A-02	03/21/83	64.57	28.53	28.82	23.98	2.24	4.18	2.69	32.90	7.54
4-A-03	03/21/83	83.84	34.37	33.67	30.53	2.49	4.24	2.75	43.90	13.20
4-A-04	03/21/83	63.09	27.94	27.55	31.19	2.29	4.82	2.02	57.20	19.99
4-A-05	03/21/83	52.67	29.24	28.62	25.00	1.84	3.58	2.11	67.50	24.13
4-A-06	03/21/83	65.97	30.07	30.26	31.02	2.18	4.70	2.13	88.50	32.78
4-A-07	03/21/83	59.03	23.41	24.29	26.76	2.43	4.44	2.21	93.70	35.04
4-A-08	03/21/83	43.16	25.40	24.66	23.19	1.79	3.38	1.86	100.00	37.27
4-A-09	03/21/83	24.30	14.81	14.63	15.96	1.66	2.75	1.52	140.10	46.68
4-A-10	03/21/83	33.46	18.19	18.18	19.41	1.84	3.55	1.72	148.50	48.36
4-A-11	03/21/83	48.14	18.58	19.64	17.80	2.45	4.17	2.70	156.60	50.65
4-A-12	03/21/83	21.07	16.67	16.59	13.36	1.27	2.62	1.58	167.80	53.34
4-A-13	03/21/83	36.25	23.45	23.08	23.88	1.57	2.94	1.52	179.60	55.69
4-A-14	03/21/83	71.69	22.58	23.42	26.31	3.06	4.64	2.72	188.30	58.95
4-A-15	03/21/83	58.60	26.36	27.12	22.20	2.16	4.06	2.64	197.70	63.21
4-A-END	03/21/83	58.60							210.00	68.21
4-A-01	04/19/83	34.88	27.02	27.25	28.19	1.28	2.50	1.24	21.20	2.57
4-A-02	04/19/83	60.17	28.69	28.92	23.68	2.08	3.92	2.54	32.90	6.43
4-A-03	04/19/83	80.78	34.69	34.22	31.13	2.36	4.09	2.59	43.90	11.81
4-A-04	04/19/83	68.84	27.65	27.75	31.74	2.48	4.79	2.17	57.20	18.72
4-A-05	04/19/83	64.24	29.64	30.59	20.11	2.10	4.08	3.19	67.50	23.48
4-A-06	04/19/83	69.98	29.90	29.65	24.65	24.62	2.36	2.84	88.50	33.26
4-A-07	04/19/83	58.04	27.15	27.12	29.00	2.14	4.35	2.00	93.70	35.58
4-A-08	04/19/83	62.21	24.66	25.28	24.70	2.46	4.88	2.52	100.00	38.21
4-A-09	04/19/83	22.58	13.89	14.11	13.98	1.60	2.74	1.62	140.10	50.02
4-A-10	04/19/83	41.03	18.89	19.26	21.20	2.13	4.16	1.94	148.50	51.87
4-A-11	04/19/83	51.68	16.30	16.35	18.27	3.16	5.39	2.83	156.60	54.48
4-A-12	04/19/83	26.43	15.76	16.41	13.46	1.61	3.02	1.96	167.80	57.52
4-A-13	04/19/83	39.81	22.39	23.14	23.42	1.72	3.37	1.70	179.60	60.24
4-A-14	04/19/83	68.14	23.74	24.68	26.73	2.76	4.42	2.55	188.30	63.49
4-A-15	04/19/83	63.18	27.74	27.83	24.96	2.27	4.15	2.53	197.70	67.78
4-A-END	04/19/83	63.18							210.00	73.18

EPHEMERAL GULLIES
SITE-4, GULLY-B, CYCLE-1

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
4-B-04	03/21/83	57.67	27.44	27.72	27.25	2.08	3.96	2.12	88.50	19.89
4-B-01	03/21/83	25.32	21.89	23.22	10.64	1.09	2.31	2.38	28.40	2.50
4-B-02	03/21/83	69.42	25.71	25.71	20.78	2.70	3.75	3.34	35.60	4.87
4-B-03	03/21/83	86.65	34.05	35.22	23.82	2.46	5.77	3.64	54.40	9.37
4-B-05	03/21/83	64.65	33.06	33.84	34.49	1.91	3.51	1.87	66.60	25.07
4-B-06	03/21/83	62.16	31.21	32.04	33.40	1.94	3.66	1.86	79.60	30.79
4-B-07	03/21/83	103.85	35.29	35.32	38.21	2.94	5.09	2.72	92.70	38.35
4-B-08	03/21/83	184.43	35.44	35.88	41.78	5.14	8.13	4.41	102.10	47.75
4-B-09	03/21/83	129.07	34.99	34.78	41.42	3.71	8.33	3.12	112.80	59.40
4-B-10	03/21/83	106.25	33.38	33.30	37.80	3.19	6.51	2.81	122.00	66.92
4-B-11	03/21/83	182.48	34.51	34.62	42.96	5.27	9.18	4.25	133.80	78.75
4-B-12	03/21/83	180.75	35.30	36.51	40.77	4.95	8.43	4.43	146.10	94.26
4-B-13	03/21/83	90.26	34.54	34.45	37.13	2.62	4.16	2.43	153.10	100.84
4-B-14	03/21/83	95.19	35.07	35.12	31.87	2.71	4.76	2.99	162.00	106.58
4-B-END	03/21/83	95.19							205.00	135.00
4-B-01	04/19/83	13.25	12.90	13.25	12.13	1.00	1.47	1.09	28.40	1.31
4-B-02	04/19/83	68.44	27.10	27.93	24.65	2.45	3.64	2.78	35.60	3.35
4-B-03	04/19/83	99.09	34.11	35.38	24.55	2.80	5.83	4.04	46.10	9.45
4-B-04	04/19/83	55.12	28.32	28.55	24.28	1.93	3.79	2.27	54.40	13.90
4-B-05	04/19/83	87.00	32.61	34.52	37.29	2.52	3.79	2.33	66.60	19.92
4-B-06	04/19/83	62.44	34.82	35.07	30.13	1.78	3.46	2.07	79.60	26.67
4-B-07	04/19/83	114.67	35.34	36.99	40.42	3.10	5.40	2.84	92.70	34.72
4-B-08	04/19/83	143.28	35.37	36.45	40.14	3.93	6 41	3.57	102.10	43.14
4-B-09	04/19/83	115.50	35.75	35.75	39.97	3.23	7.15	2.89	112.80	52.75
4-B-10	04/19/83	114.24	29.98	31.47	34.21	3.63	6.33	3.34	122.00	60.09
4-B-11	04/19/83	206.13	34.76	36.09	44.24	5.71	9.55	4.66	133.80	73.21
4-B-12	04/19/83	171.65	34.70	36.13	40.18	4.75	7.88	4.27	146.10	89.34
4-B-13	04/19/83	81.78	35.38	34.94	37.67	2.34	4.53	2.17	153.10	95.50
4-B-14	04/19/83	91.28	33.86	34.57	31.04	2.64	5.17	2.94	162.00	100.85
4-B-END	04/19/83	91.28							205.00	128.11

EPHEMERAL GULLIES
SITE-1, GULLY-A, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
1-A-01	10/05/83	21.34	31.77	30.48	33.95	0.70	2.29	0.63	12.40	0.92
1-A-02	10/05/83	17.90	23.56	19.67	27.22	0.91	3.10	0.66	17.60	1.62
1-A-03	10/05/83	30.13	30.82	30.12	32.98	1.00	3.03	0.91	23.80	2.66
1-A-04	10/05/83	50.30	35.26	34.68	26.50	1.45	3.22	1.90	27.90	3.80
1-A-05	10/05/83	131.84	35.48	36.12	40.93	3.65	6.75	3.22	40.80	11.96
1-A-06	10/05/83	106.70	34.83	35.44	37.52	3.01	5.28	2.84	52.40	21.57
1-A-07	10/05/83	67.40	34.76	35.28	36.19	1.91	3.32	1.86	64.60	28.95
1-A-08	10/05/83	43.99	35.09	34.91	37.54	1.26	3.12	1.17	73.00	32.19
1-A-END	10/05/83	43.99							167.80	33.96
1-A-01	02/02/84	59.49	31.27	32.15	33.02	1.85	3.84	1.80	12.40	2.56
1-A-02	02/02/84	46.25	16.94	17.12	22.39	2.70	4.61	2.07	17.60	4.47
1-A-03	02/02/84	93.67	17.82	18.77	30.64	4.99	9.97	3.06	23.80	7.48
1-A-04	02/02/84	99.21	21.60	23.01	27.83	4.31	6.07	3.56	27.90	10.22
1-A-05	02/02/84	58.48	20.68	20.59	28.54	2.84	6.04	2.05	40.80	17.29
1-A-06	02/02/84	69.27	33.91	34.46	39.00	2.01	4.04	1.78	52.40	22.43
1-A-07	02/02/84	33.20	35.34	34.94	31.55	0.95	2.78	1.05	64.60	26.77
1-A-08	02/02/84	13.64	30.10	31.72	39.69	0.43	2.36	0.34	73.00	28.14
1-A-09	02/02/84	31.31	17.21	17.39	19.20	1.80	2.78	1.63	81.20	29.42
1-A-10	02/02/84	173.80	27.72	29.65	41.04	5.86	9.70	4.23	93.30	38.04
1-A-11	02/02/84	116.23	32.61	32.92	38.00	3.53	7.34	3.06	120.20	65.13
1-A-12	02/02/84	98.02	28.37	28.66	32.30	3.42	5.23	3.03	128.70	71.45
1-A-13	02/02/84	32.64	35.09	35.47	37.00	0.92	1.79	0.88	139.00	76.13
1-A-14	02/02/84	41.13	21.12	21.64	24.26	1.90	3.43	1.70	147.10	78.20
1-A-15	02/02/84	38.64	35.62	35.77	36.91	1.08	2.21	1.05	154.20	80.17
1-A-16	02/02/84	49.01	32.17	31.41	34.21	1.56	2.89	1.43	162.00	82.54
1-A-END	02/02/84	49.01							167.80	84.51
1-A-01	03/23/84	52.98	35.53	36.04	30.78	1.47	3.63	1.72	12.40	2.28
1-A-02	03/23/84	64.42	22.78	23.17	20.82	2.78	4.70	3.09	17.60	4.40
1-A-03	03/23/84	83.83	17.66	17.53	27.68	4.78	8.69	3.03	23.80	7.59
1-A-04	03/23/84	75.50	35.91	35.28	27.13	2.14	4.96	2.78	27.90	9.86
1-A-05	03/23/84	20.27	9.85	10.08	11.47	2.01	2.73	1.77	40.80	14.15
1-A-06	03/23/84	91.26	35.34	35.50	39.59	2.57	5.36	2.31	52.40	18.64
1-A-07	03/23/84	36.70	35.03	35.98	36.25	1.02	2.85	1.01	64.60	24.06
1-A-08	03/23/84	14.28	35.35	35.70	38.35	0.40	1.92	0.37	73.00	25.55
1-A-09	03/23/84	21.86	35.52	40.48	40.46	0.54	2.96	0.54	81.20	26.58
1-A-10	03/23/84	196.71	35.44	35.96	37.71	5.47	11.36	5.22	93.30	35.76
1-A-11	03/23/84	139.09	35.75	34.85	27.42	3.99	7.44	5.07	120.20	67.13
1-A-12	03/23/84	109.52	35.49	35.21	31.04	3.11	6.21	3.53	128.70	74.47
1-A-13	03/23/84	45.36	35.65	36.87	28.13	1.23	2.93	1.61	139.00	80.01
1-A-14	03/23/84	21.13	35.66	36.43	22.79	0.58	2.41	0.93	147.10	81.88
1-A-15	03/23/84	44.40	35.56	35.51	31.47	1.25	2.13	1.41	154.20	83.50

EPHEMERAL GULLIES
SITE-1, GULLY-A, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
1-A-16	03/23/84	52.07	35.31	35.91	33.02	1.45	2.98	1.58	162.00	86.11
1-A-END	03/23/84	52.07							167.80	88.21
1-A-01	04/05/84	57.76	34.71	35.43	33.12	1.63	3.58	1.74	12.40	2.49
1-A-02	04/05/84	69.78	25.92	26.23	30.00	2.66	5.32	2.33	17.60	4.79
1-A-03	04/05/84	87.59	17.54	17.62	27.83	4.97	8.41	3.15	23.80	8.18
1-A-04	04/05/84	90.63	35.65	36.54	30.61	2.48	5.26	2.96	27.90	10.71
1-A-05	04/05/84	35.97	35.42	35.61	32.20	1.01	3.13	1.12	40.80	16.38
1-A-06	04/05/84	90.84	35.25	35.62	39.36	2.55	4.48	2.31	52.40	21.49
1-A-07	04/05/84	27.75	35.24	37.00	36.66	0.75	2.47	0.76	64.60	26.52
1-A-08	04/05/84	16.12	35.10	41.33	37.75	0.39	1.59	0.43	73.00	27.80
1-A-09	04/05/84	28.83	35.58	38.43	40.94	0.75	3.01	0.70	81.20	29.08
1-A-10	04/05/84	199.63	35.74	35.90	37.98	5.56	9.88	5.26	93.30	38.68
1-A-11	04/05/84	155.31	35.63	35.70	30.65	4.35	8.34	5.07	120.20	71.83
1-A-12	04/05/84	132.44	35.44	35.98	35.72	3.68	7.47	3.71	128.70	80.33
1-A-13	04/05/84	41.84	35.39	36.06	18.80	1.16	2.71	2.23	139.00	86.56
1-A-14	04/05/84	10.76	34.83	38.42	21.03	0.28	2.05	0.51	147.10	88.04
1-A-15	04/05/84	24.22	35.18	35.10	30.01	0.69	1.76	0.81	154.20	88.91
1-A-16	04/05/84	58.74	35.07	35.17	32.14	1.67	3.03	1.83	162.00	91.15
1-A-END	04/05/84	58.74							167.80	93.52
1-A-01	04/25/84	54.12	35.67	37.06	31.70	1.46	3.54	1.71	12.40	2.33
1-A-02	04/25/84	67.54	35.19	37.52	33.20	1.80	5.31	2.03	17.60	4.53
1-A-03	04/25/84	84.25	17.67	17.73	27.53	4.75	8.30	3.06	23.80	7.80
1-A-04	04/25/84	107.46	24.19	25.04	29.45	4.29	5.54	3.65	27.90	10.52
1-A-05	04/25/84	36.79	34.78	33.75	33.28	1.09	3.35	1.11	40.80	16.98
1-A-06	04/25/84	65.27	35.92	36.66	37.50	1.78	3.38	1.74	52.40	21.09
1-A-07	04/25/84	43.10	35.63	36.83	37.00	1.17	2.98	1.16	64.60	25.67
1-A-08	04/25/84	17.37	35.41	32.77	23.05	-0.53	0.97	0.75	73.00	27.44
1-A-09	04/25/84	35.85	35.43	38.13	40.82	0.94	3.52	0.88	81.20	28.96
1-A-10	04/25/84	180.13	36.03	36.91	35.50	4.88	9.45	5.07	93.30	38.03
1-A-11	04/25/84	129.43	35.98	36.15	28.96	3.58	7.27	4.47	120.20	66.95
1-A-12	04/25/84	124.20	35.28	35.48	31.94	3.50	6.83	3.89	128.70	74.44
1-A-13	04/25/84	43.04	35.67	36.78	17.40	1.17	2.49	2.47	139.00	80.42
1-A-14	04/25/84	17.72	35.74	37.70	21.17	0.47	2.33	0.84	147.10	82.13
1-A-15	04/25/84	37.87	35.79	36.41	30.58	1.04	2.23	1.24	154.20	83.50
1-A-16	04/25/84	57.72	35.64	36.76	32.91	1.57	2.92	1.75	162.00	86.09
1-A-END	04/25/84	57.72							167.80	88.42
1-A-01	05/03/84	49.59	35.99	38.14	30.69	1.30	3.16	1.62	12.40	2.13
1-A-02	05/03/84	80.62	35.97	35.35	35.74	2.28	5.26	2.26	17.60	4.48
1-A-03	05/03/84	94.51	19.08	19.20	28.62	4.92	8.57	3.30	23.80	8.25
1-A-04	05/03/84	75.96	36.23	36.17	30.55	2.10	4.63	2.49	27.90	10.68

EPHEMERAL GULLIES
SITE-1, GULLY-A, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
1-A-05	05/03/84	30.62	35.45	36.02	32.55	0.85	2.90	0.94	40.80	15.45
1-A-06	05/03/84	47.97	35.61	36.06	33.00	1.33	2.35	1.45	52.40	18.62
1-A-07	05/03/84	28.23	14.96	15.34	16.65	1.84	2.64	1.70	64.60	21.84
1-A-08	05/03/84	2.81	35.78	25.54	38.47	0.11	2.01	0.07	73.00	22.75
1-A-09	05/03/84	31.50	35.92	42.56	37.00	0.74	3.59	0.85	81.20	23.73
1-A-10	05/03/84	177.77	35.98	36.20	37.17	4.91	10.12	4.78	93.30	32.53
1-A-11	05/03/84	126.22	36.03	35.06	28.95	3.60	7.48	4.36	120.20	60.93
1-A-12	05/03/84	127.30	35.99	36.89	32.44	3.45	7.43	3.92	128.70	68.42
1-A-13	05/03/84	37.27	35.53	36.18	27.29	1.03	2.17	1.37	139.00	74.31
1-A-14	05/03/84	24.74	35.80	36.92	22.91	0.67	2.53	1.08	147.10	76.05
1-A-15	05/03/84	45.26	35.75	36.49	30.04	1.24	2.44	1.51	154.20	77.78
1-A-16	05/03/84	47.36	36.02	37.29	32.00	1.27	2.89	1.48	162.00	80.28
1-A-END	05/03/84	47.36							167.80	82.19

EPHEMERAL GULLIES
SITE-1, GULLY-B, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
1-B-01	10/05/83	27.84	35.23	29.30	37.50	0.95	3.08	0.74	1.70	0.16
1-B-02	10/05/83	46.16	35.23	34.70	37.50	1.33	3.17	1.23	9.40	2.14
1-B-03	10/05/83	62.42	35.47	36.71	39.00	1.70	4.56	1.60	17.10	5.05
1-B-04	10/05/83	78.30	35.51	36.41	32.85	2.15	3.25	2.38	22.90	7.88
1-B-05	10/05/83	74.35	33.98	34.26	30.53	2.17	4.55	2.44	27.50	10.32
1-B-06	10/05/83	67.18	35.33	35.35	38.84	1.90	3.48	1.73	35.30	14.15
1-B-07	10/05/83	79.68	35.43	36.05	34.62	2.21	3.86	2.30	40.80	16.96
1-B-08	10/05/83	52.85	35.49	36.44	36.59	1.45	2.81	1.44	47.60	20.08
1-B-09	10/05/83	41.07	35.47	36.02	26.33	1.14	2.47	1.56	54.00	22.17
1-B-END	10/05/83	41.07							62.00	24.45
1-B-01	02/02/84	152.40	34.71	34.95	41.67	4.36	7.83	3.66	1.70	0.90
1-B-02	02/02/84	111.33	35.43	34.57	41.32	3.22	7.76	2.69	9.40	7.95
1-B-03	02/02/84	113.66	35.79	37.38	44.38	3.04	8.50	2.56	17.10	13.96
1-B-04	02/02/84	127.79	28.60	27.36	36.62	4.67	8.14	3.49	22.90	18.82
1-B-05	02/02/84	80.94	22.89	22.73	30.60	3.56	6.04	2.65	27.50	22.16
1-B-06	02/02/84	28.79	20.48	21.16	21.82	1.36	2.06	1.32	35.30	25.13
1-B-07	02/02/84	23.86	13.77	11.75	20.14	2.03	5.22	1.18	40.80	26.13
1-B-08	02/02/84	48.40	15.17	15.71	34.00	3.08	5.12	1.42	47.60	27.84
1-B-09	02/02/84	96.73	26.89	27.32	27.83	3.54	5.58	3.48	54.00	31.07
1-B-END	02/02/84	96.73							62.00	36.44
1-B-01	03/23/84	188.02	35.45	35.81	48.45	5.25	9.79	3.88	1.70	1.11
1-B-02	03/23/84	151.56	35.68	35.24	45.66	4.30	9.30	3.32	9.40	10.19
1-B-03	03/23/84	104.99	24.51	24.87	24.00	4.22	7.46	4.37	17.10	17.05
1-B-04	03/23/84	90.07	18.89	19.36	26.14	4.65	7.51	3.45	22.90	20.97
1-B-05	03/23/84	105.99	35.50	35.80	40.38	2.96	6.85	2.62	27.50	24.10
1-B-06	03/23/84	0.07	35.54	-7.00	35.95	-0.01	0.73	0.00	35.30	26.97
1-B-07	03/23/84	109.79	28.02	28.15	35.39	3.90	7.88	3.10	40.80	29.07
1-B-08	03/23/84	90.85	21.18	22.59	27.69	4.02	6.28	3.28	47.60	33.80
1-B-09	03/23/84	107.49	35.76	36.43	40.76	2.95	4.65	2.64	54.00	38.21
1-B-END	03/23/84	107.49							62.00	44.18
1-B-01	04/05/84	184.40	25.49	26.72	38.69	6.90	11.60	4.77	1.70	1.09
1-B-02	04/05/84	81.28	18.28	19.63	25.53	4.14	6.60	3.18	9.40	8.19
1-B-03	04/05/84	86.98	19.02	19.24	23.90	4.52	6.17	3.64	17.10	12.69
1-B-04	04/05/84	110.44	19.51	20.48	29.93	5.39	9.06	3.69	22.90	16.66
1-B-05	04/05/84	106.77	34.44	35.00	38.50	3.05	6.23	2.77	27.50	20.13
1-B-06	04/05/84	7.83	35.57	34.04	36.44	0.23	1.47	0.21	35.30	23.23
1-B-07	04/05/84	119.59	23.23	24.35	33.63	4.91	8.59	3.56	40.80	25.66
1-B-08	04/05/84	73.36	16.79	17.46	23.15	4.20	5.54	3.17	47.60	30.22
1-B-09	04/05/84	99.54	35.32	35.42	39.40	2.81	4.47	2.53	54.00	34.06
1-B-END	04/05/84	99.54							62.00	39.59

EPHEMERAL GULLIES
SITE-1, GULLY-B, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
1-B-01	04/25/84	114.12	21.51	22.94	31.29	6.28	10.55	3.65	1.70	0.67
1-B-02	04/25/84	103.68	20.33	20.57	25.06	5.04	8.94	4.14	9.40	6.49
1-B-03	04/25/84	102.64	22.18	23.75	29.07	4.32	7.33	3.53	17.10	12.01
1-B-04	04/25/84	116.30	19.59	20.84	31.01	5.58	9.76	3.75	22.90	16.42
1-B-05	04/25/84	115.60	35.65	35.35	40.98	3.27	6.43	2.82	27.50	20.13
1-B-06	04/25/84	8.56	35.64	34.23	36.48	0.25	1.19	0.23	35.30	23.49
1-B-07	04/25/84	118.86	22.47	22.30	33.73	5.33	9.47	3.52	40.80	25.92
1-B-08	04/25/84	109.55	26.29	26.46	33.42	4.14	6.96	3.28	47.60	31.31
1-B-09	04/25/84	102.95	27.80	28.43	33.09	3.62	4.95	3.11	54.00	36.04
1-B-END	04/25/84	102.95							62.00	41.76
1-B-01	05/03/84	256.06	35.50	36.06	48.92	7.10	14.34	5.23	1.70	1.51
1-B-02	05/03/84	163.21	35.33	36.51	46.32	4.47	8.80	3.52	9.40	12.72
1-B-03	05/03/84	102.85	19.76	21.50	27.29	4.76	7.31	3.77	17.10	19.83
1-B-04	05/03/84	79.34	16.45	17.32	28.21	4.58	8.53	2.81	22.90	23.50
1-B-05	05/03/84	106.55	35.41	35.99	41.01	2.96	5.86	2.60	27.50	26.47
1-B-06	05/03/84	0.59	35.86	59.00	37.25	0.01	1.01	0.02	35.30	29.37
1-B-07	05/03/84	122.13	17.03	18.31	29.46	6.67	9.00	4.15	40.80	31.71
1-B-08	05/03/84	97.28	21.86	23.05	28.64	4.22	6.57	3.40	47.60	36.89
1-B-09	05/03/84	114.85	35.37	35.77	42.67	3.21	5.94	2.69	54.00	41.61
1-B-END	05/03/84	114.85							62.00	47.99

EPHEMERAL GULLIES
SITE-1, GULLY-C, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
1-C-01	10/05/83	64.36	35.27	35.36	35.08	1.82	2.99	1.83	1.60	0.36
1-C-02	10/05/83	89.04	35.25	34.11	39.00	2.61	5.40	2.28	10.00	4.83
1-C-03	10/05/83	253.44	35.61	34.52	52.72	7.34	13.39	4.81	21.20	18.15
1-C-END	10/05/83	253.44							92.20	26.95
1-C-01	02/02/84	20.85	11.13	11.58	14.45	1.80	3.33	1.44	1.60	0.12
1-C-02	02/02/84	34.76	35.36	35.83	36.83	0.97	2.81	0.94	10.00	1.74
1-C-03	02/02/84	60.99	35.40	35.87	25.99	1.70	4.40	2.35	21.20	5.46
1-C-04	02/02/84	91.52	35.53	35.89	46.50	2.55	7.93	1.97	39.20	15.00
1-C-05	02/02/84	131.84	35.72	34.51	45.53	3.82	10.15	2.90	51.30	24.39
1-C-06	02/02/84	162.28	35.37	35.35	43.58	4.59	9.55	3.72	56.80	30.01
1-C-07	02/02/84	115.79	35.56	35.19	41.28	3.29	7.46	2.80	61.90	34.93
1-C-08	02/02/84	69.23	35.43	34.44	39.50	2.01	6.89	1.75	69.70	39.94
1-C-09	02/02/84	80.61	35.71	36.64	31.24	2.20	5.30	2.58	72.60	41.45
1-C-10	02/02/84	25.93	35.44	32.82	36.75	0.79	2.35	0.71	82.00	44.93
1-C-11	02/02/84	27.88	35.06	34.84	21.14	0.80	1.96	1.32	87.20	45.90
1-C-END	02/02/84	27.88							92.20	46.87
1-C-01	03/23/84	29.69	35.62	36.20	35.84	0.82	2.69	0.83	1.60	0.16
1-C-02	03/23/84	38.78	35.14	34.62	36.30	1.12	3.31	1.07	10.00	2.16
1-C-03	03/23/84	72.45	35.46	34.33	39.84	2.11	5.57	1.82	21.20	6.48
1-C-04	03/23/84	87.02	20.09	19.91	31.70	4.37	7.48	2.75	39.20	16.45
1-C-05	03/23/84	71.50	15.73	15.47	24.41	4.62	7.99	2.93	51.30	23.11
1-C-06	03/23/84	97.49	24.41	25.79	35.46	3.78	7.17	2.75	56.80	26.34
1-C-07	03/23/84	108.56	25.63	24.82	33.89	4.05	8.74	3.20	61.90	29.98
1-C-08	03/23/84	123.59	35.27	34.91	41.79	3.54	8.29	2.96	69.70	36.27
1-C-09	03/23/84	88.79	35.58	34.28	42.27	2.59	6.84	2.10	72.60	38.41
1-C-10	03/23/84	33.17	35.42	35.66	36.53	0.93	2.52	0.91	82.00	42.39
1-C-11	03/23/84	45.11	35.50	35.51	36.34	1.27	3.04	1.24	87.20	43.80
1-C-END	03/23/84	45.11							92.20	45.37
1-C-01	04/05/84	34.46	35.34	35.16	34.01	0.98	2.30	1.01	1.60	0.19
1-C-02	04/05/84	37.30	33.84	35.18	34.50	1.06	2.72	1.08	10.00	2.28
1-C-03	04/05/84	60.19	23.41	23.88	27.37	2.52	5.14	2.20	21.20	6.07
1-C-04	04/05/84	122.47	23.32	24.44	34.70	5.01	9.28	3.53	39.20	17.49
1-C-05	04/05/84	103.26	21.82	22.44	31.50	4.60	9.70	3.28	51.30	26.97
1-C-06	04/05/84	121.65	25.25	26.33	31.57	4.62	7.68	3.85	56.80	31.26
1-C-07	04/05/84	130.93	33.81	32.56	43.50	4.02	9.96	3.01	61.90	35.73
1-C-08	04/05/84	127.42	27.58	27.76	33.17	4.59	8.44	3.84	69.70	42.73
1-C-09	04/05/84	40.84	15.41	15.52	22.26	2.63	4.74	1.83	72.60	44.43
1-C-10	04/05/84	39.00	23.82	23.78	26.12	1.64	3.22	1.49	82.00	47.03
1-C-END	04/05/84	39.00							92.20	48.39

EPHEMERAL GULLIES
SITE-1, GULLY-C, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
1-C-01	04/25/84	23.01	35.81	35.39	37.72	0.65	2.45	0.61	1.60	0.12
1-C-02	04/25/84	34.93	35.10	34.24	35.56	1.02	3.19	0.98	10.00	1.82
1-C-03	04/25/84	46.98	14.87	15.35	19.75	3.06	5.15	2.38	21.20	5.01
1-C-04	04/25/84	117.64	19.02	20.63	29.48	5.70	8.96	3.99	39.20	15.29
1-C-05	04/25/84	164.27	35.68	34.22	39.13	4.80	12.01	4.20	51.30	27.14
1-C-06	04/25/84	188.48	35.78	35.76	36.67	5.27	10.41	5.14	56.80	33.88
1-C-07	04/25/84	146.92	35.85	35.14	46.05	4.18	10.42	3.19	61.90	39.82
1-C-08	04/25/84	129.61	35.62	35.50	41.41	3.65	7.93	3.13	69.70	47.30
1-C-09	04/25/84	85.48	35.97	34.74	41.29	2.46	6.74	2.07	72.60	49.47
1-C-10	04/25/84	36.30	35.36	34.24	36.50	1.06	3.83	0.99	82.00	53.45
1-C-11	04/25/84	44.56	35.89	35.64	36.50	1.25	2.76	1.22	87.20	54.91
1-C-END	04/25/84	44.56							92.20	56.45
1-C-01	05/03/84	25.10	35.97	37.46	38.50	0.67	1.86	0.65	1.60	0.14
1-C-02	05/03/84	32.39	35.93	36.39	37.47	0.89	3.12	0.86	10.00	1.82
1-C-03	05/03/84	71.33	24.40	23.17	29.78	2.95	5.80	2.40	21.20	5.85
1-C-04	05/03/84	118.97	25.09	26.08	35.02	4.56	7.81	3.40	39.20	17.74
1-C-05	05/03/84	175.98	35.95	33.77	40.09	5.21	12.85	4.39	51.30	30.13
1-C-06	05/03/84	179.81	35.94	35.05	32.24	5.13	10.13	5.58	56.80	36.92
1-C-07	05/03/84	108.94	24.78	24.59	36.08	4.43	9.72	3.02	61.90	42.04
1-C-08	05/03/84	127.89	35.25	36.02	39.50	3.55	8.83	3.24	69.70	48.45
1-C-09	05/03,84	58.41	35.86	34.35	38.61	1.70	4.85	1.51	72.60	50.33
1-C-11	05/03/84	59.28	35.71	35.92	37.01	1.65	3.50	1.60	87.20	52.46
1-C-END	05/03/84	59.28							92.20	54.52

EPHEMERAL GULLIES
SITE-1, GULLY-D, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
1-D-01	10/05/83	27.11	35.42	33.46	37.41	0.81	2.69	0.72	2.00	0.19
1-D-02	10/05/83	25.02	35.26	34.27	37.17	0.73	2.33	0.67	11.20	1.85
1-D-03	10/05/83	27.78	35.62	32.30	37.50	0.86	3.33	0.74	16.70	2.86
1-D-04	10/05/83	31.69	35.08	31.06	37.50	1.02	2.70	0.85	24.00	4.37
1-D-05	10/05/83	50.10	35.54	34.79	28.12	1.44	3.22	1.78	29.30	5.88
1-D-06	10/05/83	54.28	35.12	35.71	29.80	1.52	2.81	1.82	36.60	8.52
1-D-07	10/05/83	52.75	35.41	34.03	36.75	1.55	3.29	1.44	41.90	10.49
1-D-08	10/05/83	65.86	35.27	34.48	28.34	1.91	3.51	2.32	49.00	13.41
1-D-END	10/05/83	65.86							56.30	16.75
1-D-01	02/02/84	8.43	35.37	38.31	18.83	0.22	1.46	0.45	2.00	0.06
1-D-02	02/02/84	38.16	35.57	34.37	29.36	1.11	3.84	1.30	11.20	1.55
1-D-03	02/02/84	34.52	35.63	34.86	58.78	0.99	3.24	0.89	16.70	2.94
1-D-04	02/02/84	72.71	35.62	34.95	28.81	2.08	6.06	2.52	24.00	5.66
1-D-05	02/02/84	84.75	35.28	35.16	39.46	2.41	4.83	2.15	29.30	8.56
1-D-06	02/02/84	76.27	35.43	35.31	32.02	2.16	4.52	2.38	36.60	12.64
1-D-07	02/02/84	57.21	35.58	35.31	39.77	1.62	3.70	1.44	41.90	15.10
1-D-08	02/02/84	23.79	35.30	36.04	35.91	0.66	1.39	0.66	49.00	17.09
1-D-END	02/02/84	23.79							56.30	18.30
1-D-01	03/23/84	26.59	35.59	36.42	36.13	0.73	1.78	0.74	2.00	0.18
1-D-02	03/23/84	21.74	35.48	37.48	37.19	0.58	1.90	0.58	11.20	1.73
1-D-03	03/23/84	17.46	35.61	35.63	49.15	-0.49	1.15	0.36	16.70	2.48
1-D-04	03/23/84	71.24	15.05	15.76	23.43	4.52	7.47	3.04	24.00	4.73
1-D-05	03/23/84	134.70	35.58	36.11	42.07	3.73	6.50	3.20	29.30	8.52
1-D-06	03/23/84	91.11	35.70	36.29	38.89	2.51	5.60	2.34	36.60	14.24
1-D-07	03/23/84	49.83	35.47	35.59	39.18	1.40	3.59	1.27	41.90	16.83
1-D-08	03/23/84	14.39	35.47	37.86	27.04	0.38	1.9	0.53	49.00	18.42
1-D-END	03/23/84	71.24							56.30	20.59
1-D-01	04/05/84	26.73	35.24	35.17	35.00	0.76	1.95	0.76	2.00	0.19
1-D-02	04/05/84	43.09	35.59	35.31	40.61	1.22	3.53	1.06	11.20	2.42
1-D-03	04/05/84	0.00	35.64	35.71	2.32	-0.25	1.18	0.00	16.70	3.24
1-D-04	04/05/84	97.08	35.34	33.24	46.17	2.92	8.97	2.10	24.00	5.70
1-D-05	04/05/84	129.23	35.26	35.50	39.54	3.64	6.35	3.27	29.30	9.86
1-D-06	04/05/84	97.39	35.66	36.33	38.30	2.68	5.38	2.54	36.60	15.60
1-D-07	04/05/84	48.88	35.72	35.94	38.38	1.36	3.36	1.27	41.90	18.29
1-D-08	04/05/84	28.46	9.81	9.95	12.17	2.86	4.29	2.34	49.00	20.20
1-D-END	04/05/84	28.46							56.30	21.65
1-D-01	04/25/84	23.66	35.52	35.84	35.86	0.66	1.63	0.66	2.00	0.16
1-D-02	04/25/84	50.06	34.82	34.76	39.79	1.44	3.47	1.26	11.20	2.52
1-D-03	04/25/84	0.00	35.38	23.35	37.00	-0.14	1.13	0.00	16.70	3.48

EPHEMERAL GULLIES
SITE-1, GULLY-D, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
1-D-04	04/25/84	70.71	14.73	14.63	26.49	4.83	9.52	2.67	24.00	5.27
1-D-05	04/25/84	122.88	35.35	35.41	40.66	3.47	5.66	3.02	29.30	8.83
1-D-06	04/25/84	101.53	34.96	34.65	37.59	2.93	5.46	2.70	36.60	14.52
1-D-07	04/25/84	53.25	35.30	35.26	38.34	1.51	3.28	1.39	41.90	17.37
1-D-08	04/25/84	20.56	35.89	37.38	24.52	0.55	1.63	0.84	49.00	19.19
1-D-END	04/25/84	20.56							56.30	20.23
1-D-01	05/03/84	40.35	34.88	34.78	35.91	1.16	2.10	1.12	2.00	0.28
1-D-02	05/03/84	42.78	33.68	33.42	37.86	1.28	3.23	1.13	11.20	2.93
1-D-03	05/03/84	20.10	10.43	11.10	13.75	1.81	3.00	1.46	16.70	4.14
1-D-04	05/03/84	77.28	13.77	15.36	28.31	5.03	9.57	2.73	24.00	6.61
1-D-05	05/03/84	143.12	35.13	35.33	42.13	4.05	6.32	3.40	29.30	10.66
1-D-06	05/03/84	118.03	23.23	23.79	28.40	4.96	8.01	4.16	36.60	17.29
1-D-07	05/03/84	43.45	35.58	36.51	37.22	1.19	3.21	1.17	41.90	20.26
1-D-08	05/03/84	35.46	19.53	19.16	18.97	1.85	2.99	1.87	49.00	22.20
1-D-END	05/03/84	35.46							56.30	24.00

EPHEMERAL GULLIES
SITE-2, GULLY-A, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
2-A-01	01/20/84	47.02	34.71	35.89	37.74	1.31	2.60	1.25	0.00	0.00
2-A-02	01/20/84	14.55	6.35	5.36	15.85	2.71	5.40	0.92	7.60	1.63
2-A-03	01/20/84	87.25	19.93	21.70	24.64	4.02	5.92	3.54	24.20	7.49
2-A-04	01/20/84	108.66	26.91	27.57	31.73	3.94	6.43	3.42	30.30	11.65
2-A-05	01/20/84	90.34	31.08	30.72	34.64	2.94	5.95	2.61	37.30	16.48
2-A-06	01/20/84	77.20	26.72	27.18	30.09	2.84	5.05	2.57	44.40	20.61
2-A-07	01/20/84	56.54	29.44	28.99	32.46	1.95	3.50	1.74	50.70	23.54
2-A-08	01/20/84	71.24	35.06	35.79	36.99	1.99	3.01	1.93	57.80	26.69
2-A-09	01/20/84	15.78	35.20	35.86	36.74	0.44	1.10	0.43	64.10	28.60
2-A-10	01/20/84	21.39	8.85	9.02	13.46	2.37	4.16	1.59	89.10	31.83
2-A-11	01/20/84	38.54	20.25	20.50	23.22	1.88	3.93	1.66	93.60	32.77
2-A-12	01/20/84	35.76	17.87	17.96	21.74	1.99	4.67	1.64	97.80	33.86
2-A-13	01/20/84	49.60	29.71	29.34	32.10	1.69	3.01	1.55	104.70	35.90
2-A-14	01/20/84	101.12	31.94	30.36	40.62	3.33	7.67	2.49	112.20	39.82
2-A-15	01/20/84	107.60	33.33	33.62	37.48	3.20	5.38	2.87	120.90	46.12
2-A-16	01/20/84	102.06	35.32	36.06	37.80	2.83	4.41	2.70	126.60	50.27
2-A-17	01/20/84	81.58	31.24	31.49	33.80	2.59	4.03	2.41	131.80	53.59
2-A-18	01/20/84	73.77	25.60	24.92	28.53	2.96	4.89	2.59	139.70	57.85
2-A-END	01/20/84	73.77							141.50	58.77
2-A-01	03/23/84	59.08	35.47	35.80	37.05	1.65	2.64	1.59	0.00	0.00
2-A-02	03/23/84	65.53	35.55	33.77	48.72	1.94	6.11	1.35	7.60	3.29
2-A-03	03/23/84	145.37	35.47	35.62	42.00	4.08	7.96	3.46	24.20	15.45
2-A-04	03/23/84	121.01	35.47	37.11	33.60	3.26	5.98	3.60	30.30	21.09
2-A-05	03/23/84	106.50	35.77	36.59	35.16	2.91	6.03	3.03	37.30	26.62
2-A-06	03/23/84	77.17	24.54	24.81	27.10	3.11	4.55	2.85	44.40	31.15
2-A-07	03/23/84	37.53	35.25	36.79	28.65	1.02	1.97	1.31	50.70	33.66
2-A-08	03/23/84	32.46	35.26	36.06	35.88	0.90	1.62	0.90	57.80	35.38
2-A-09	03/23/84	0.81	35.50	40.50	14.14	0.02	0.92	0.06	64.10	36.11
2-A-10	03/23/84	58.06	35.57	36.28	38.57	1.60	3.73	1.51	89.10	41.22
2-A-11	03/23/84	44.03	14.21	14.48	16.60	3.04	4.95	2.65	93.60	42.82
2-A-12	03/23/84	27.65	35.67	34.99	29.18	0.79	3.93	0.95	97.80	43.87
2-A-13	03/23/84	91.02	35.62	36.55	31.03	2.49	5.94	2.93	104.70	46.71
2-A-14	03/23/84	62.01	12.74	14.15	21.89	4.38	5.81	2.83	112.20	50.69
2-A-15	03/23/84	132.03	35.52	35.20	32.99	3.75	6.16	4.00	120.90	56.56
2-A-16	03/23/84	64.02	35.40	35.76	28.45	1.79	3.39	2.25	126.60	60.44
2-A-17	03/23/84	91.39	35.45	35.42	36.98	2.58	4.10	2.47	131.80	63.25
2-A-18	03/23/84	73.76	35.38	35.80	36.07	2.06	4.49	2.04	139.70	67.78
2-A-END	03/23/84	73.76							141.50	68.70
2-A-01	04/05/84	51.78	35.12	35.71	36.55	1.45	2.21	1.42	0.00	0.00
2-A-02	04/05/84	74.78	35.49	37.20	46.98	2.01	5.60	1.59	7.60	3.34
2-A-03	04/05/84	135.81	35.64	36.60	48.50	3.71	7.60	2.80	24.20	15.47

EPHEMERAL GULLIES
SITE-2, GULLY-A, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
2-A-04	04/05/84	102.90	35.77	37.55	30.50	2.74	5.11	3.37	30.30	20.53
2-A-05	04/05/84	75.90	35.15	36.14	34.46	2.10	4.92	2.20	37.30	24.88
2-A-06	04/05/84	73.75	35.37	37.06	33.22	1.99	3.63	2.22	44.40	28.57
2-A-07	04/05/84	28.60	35.66	36.66	29.23	0.78	1.36	0.98	50.70	30.81
2-A-08	04/05/84	15.97	35.33	36.29	35.67	0.44	0.86	0.45	57.80	31.91
2-A-09	04/05/84	7.17	34.82	35.84	34.99	0.20	0.50	0.20	64.10	32.41
2-A-10	04/05/84	50.59	35.17	36.92	37.71	1.37	3.58	1.34	89.10	37.43
2-A-11	04/05/84	47.51	16.64	16.49	20.30	2.88	4.59	2.34	93.60	38.96
2-A-12	04/05/84	45.34	35.48	35.14	30.63	1.29	4.44	1.48	97.80	40.31
2-A-13	04/05/84	93.56	35.31	35.70	31.32	2.62	5.83	2.99	104.70	43.64
2-A-14	04/05/84	162.87	35.67	36.19	40.60	4.50	8.53	4.01	112.20	50.32
2-A-15	04/05/84	106.77	36.21	38.26	31.42	2.79	4.93	3.40	120.90	58.46
2-A-16	04/05/84	87.28	35.30	35.19	42.20	2.48	4.31	2.07	126.60	62.30
2-A-17	04/05/84	78.51	35.69	36.34	38.01	2.16	3.82	2.07	131.80	65.30
2-A-18	04/05/84	90.11	35.73	35.61	39.05	2.53	5.41	2.31	139.70	69.92
2-A-END	04/05/84	90.11							141.50	71.05

EPHEMERAL GULLIES
SITE-2, GULLY-B, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
2-B-01	02/02/84	16.67	34.72	36.23	38.12	0.46	1.67	0.44	0.00	0.00
2-B-02	02/02/84	32.97	34.38	35.07	27.86	0.94	1.92	1.18	5.00	0.86
2-B-03	02/02/84	9.29	13.61	13.66	12.94	0.68	1.07	0.72	19.50	2.99
2-B-04	02/02/84	42.12	26.32	26.65	27.62	1.58	2.96	1.52	24.70	3.92
2-B-05	02/02/84	16.32	19.16	19.20	19.68	0.85	1.86	0.83	31.20	5.24
2-B-06	02/02/84	41.27	16.01	16.57	21.88	2.49	4.87	1.89	43.40	7.68
2-B-07	02/02/84	47.07	21.43	21.29	24.76	2.21	4.61	1.90	47.70	9.00
2-B-08	02/02/84	21.26	9.82	9.98	10.93	2.13	3.46	1.95	51.60	9.92
2-B-09	02/02/84	81.84	28.93	29.22	28.26	2.80	4.37	2.90	59.00	12.57
2-B-10	02/02/84	36.65	35.40	35.93	36.50	1.02	2.13	1.00	70.50	17.31
2-B-11	02/02/84	52.12	18.92	18.88	22.38	2.76	4.32	2.33	80.80	20.48
2-B-12	02/02/84	57.24	21.86	22.01	25.70	2.60	4.53	2.23	87.40	22.99
2-B-13	02/02/84	89.67	29.09	29.11	35.06	3.08	4.83	2.56	96.00	27.38
2-B-15	02/02/84	34.66	12.10	12.46	15.61	2.78	3.97	2.22	108.40	29.46
2-B-16	02/02/84	125.64	34.76	35.39	39.72	3.55	7.04	3.16	114.90	33.08
2-B-17	02/02/84	77.14	25.58	25.97	30.42	2.97	4.96	2.54	120.90	37.30
2-B-END	02/02/84	77.14							125.10	39.55
2-B-01	03/23/84	20.50	35.50	35.96	37.00	0.57	1.46	0.55	0.00	0.00
2-B-02	03/23/84	33.00	35.50	35.10	48.00	0.94	2.28	0.69	5.00	0.93
2-B-03	03/23/84	25.56	35.18	35.01	23.75	0.73	1.68	1.08	19.50	3.87
2-B-04	03/23/84	41.40	35.31	35.68	35.37	1.16	2.29	1.17	24.70	5.08
2-B-05	03/23/84	19.71	35.28	35.83	36.25	0.55	1.60	0.54	31.20	6.46
2-B-06	03/23/84	90.12	35.61	34.13	40.77	2.64	6.55	2.21	43.40	11.11
2-B-07	03/23/84	80.37	35.51	34.49	42.24	2.33	6.83	1.90	47.70	13.66
2-B-08	03/23/84	94.21	35.27	35.41	33.27	2.66	6.32	2.83	51.60	16.02
2-B-09	03/23/84	96.41	35.41	35.84	38.12	2.69	4.74	2.53	59.00	20.92
2-B-10	03/23/84	42.96	35.42	35.79	33.73	1.20	2.16	1.27	70.50	26.48
2-B-11	03/23/84	61.51	19.00	19.04	20.06	3.17	4.46	3.07	80.80	30.22
2-B-12	03/23/84	65.32	35.32	36.49	38.57	1.79	4.52	1.69	87.40	33.12
2-B-13	03/23/84	115.38	35.34	35.61	36.66	3.24	7.30	3.15	96.00	38.52
2-B-14	03/23/84	3.45	35.85	31.36	30.83	0.11	3.96	0.11	103.60	41.66
2-B-15	03/23/84	136.00	35.54	35.60	41.36	3.82	9.17	3.29	108.40	43.98
2-B-15	03/23/84	136.00	35.54	35.60	41.36	3.82	9.17	3.29	108.40	48.51
2-B-16	03/23/84	151.95	35.69	36.17	42.25	4.20	7.84	3.60	114.90	55.01
2-B-17	03/23/84	90.93	35.36	35.38	37.99	2.57	5.30	2.39	120.90	60.07
2-B-END	03/23/84	90.93							125.10	62.72
2-B-01	04/05/84	22.81	35.35	35.64	35.50	0.64	1.52	0.64	0.00	0.00
2-B-02	04/05/84	21.24	33.41	34.25	34.25	0.62	1.64	0.62	5.00	0.76
2-B-03	04/05/84	6.15	35.01	30.74	34.62	0.20	1.36	0.18	19.50	2.14
2-B-04	04/05/84	30.27	34.86	35.61	35.84	0.85	2.09	0.84	24.70	2.80
2-B-05	04/05/84	12.75	34.40	35.41	34.72	0.36	1.21	0.37	31.20	3.77

EPHEMERAL GULLIES
SITE-2, GULLY-B, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
2-B-06	04/05/84	81.65	35.52	34.59	40.43	2.36	5.67	2.02	43.40	7.77
2-B-07	04/05/84	85.71	25.96	26.29	31.70	3.26	6.41	2.70	47.70	10.27
2-B-08	04/05/84	51.06	18.96	19.63	22.93	2.60	4.00	2.23	51.60	12.12
2-B-09	04/05/84	81.06	34.79	35.09	37.00	2.31	4.12	2.19	59.00	15.52
2-B-10	04/05/84	23.17	35.10	35.10	35.61	0.66	1.39	0.65	70.50	19.68
2-B-11	04/05/84	53.11	18.81	19.10	16.73	2.78	4.36	3.17	80.80	22.41
2-B-12	04/05/84	56.10	35.63	35.28	38.18	1.59	4.00	1.47	87.40	24.92
2-B-13	04/05/84	81.86	23.68	24.88	24.84	3.29	5.56	3.30	96.00	29.04
2-B-14	04/05/84	5.95	36.23	28.33	44.09	0.21	4.01	0.13	103.60	31.35
2-B-15	04/05/84	109.65	22.91	23.42	27.54	4.68	8.70	3.98	108.40	33.27
2-B-16	04/05/84	168.62	35.89	36.81	41.57	4.58	8.15	4.06	114.90	39.55
2-B-17	04/05/84	91.66	35.85	36.08	38.68	2.54	5.48	2.37	120.90	44.98
2-B-END	04/05/84	91.66							125.10	47.65

EPHEMERAL GULLIES
SITE-3, GULLY-A, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
3-A-01	02/03/84	51.34	35.42	36.93	34.84	1.39	2.32	1.47	19.80	3.53
3-A-02	02/03/84	24.27	34.84	33.24	27.61	0.73	4.24	0.88	30.20	6.27
3-A-03	02/03/84	8.40	3.96	5.02	8.04	1.67	2.59	1.04	39.80	7.34
3-A-04	02/03/84	44.46	35.33	35.56	26.12	1.25	2.51	1.70	55.10	10.17
3-A-05	02/03/84	124.52	35.26	35.47	38.50	3.51	5.41	3.23	68.50	16.03
3-A-06	02/03/84	98.63	35.23	35.60	39.96	2.77	4.62	2.47	78.30	25.63
3-A-07	02/03/84	50.11	35.11	34.79	35.74	1.44	2.64	1.40	91.70	32.55
3-A-08	02/03/84	42.58	35.27	37.02	31.28	1.15	2.62	1.36	104.50	36.67
3-A-END	02/03/84	42.58							119.00	40.96
3-A-01	03/21/84	35.03	35.87	38.07	33.43	0.92	1.88	1.05	19.80	2.41
3-A-02	03/21/84	29.30	11.44	11.62	16.62	2.52	4.91	1.76	30.20	4.72
3-A-03	03/21/84	31.61	9.54	9.60	15.72	3.29	5.12	2.01	39.80	6.76
3-A-04	03/21/84	33.78	34.93	35.18	23.31	0.96	1.85	1.45	55.10	10.24
3-A-05	03/21/84	91.48	33.51	33.75	36.91	2.71	5.08	2.48	68.50	16.07
3-A-06	03/21/84	84.39	34.24	34.44	35.81	2.45	3.61	2.36	78.30	22.05
3-A-07	03/21/84	32.12	34.50	35.29	32.17	0.91	2.26	1.00	91.70	27.47
3-A-08	03/21/84	29.13	34.32	35.52	31.42	0.82	1.74	0.93	104.50	30.19
3-A-END	03/21/84	29.13							119.00	33.12

EPHEMERAL GULLIES
SITE-3, GULLY-B, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
3-B-01	02/03/84	36.27	35.41	35.31	37.57	1.03	3.72	0.97	2.90	0.37
3-B-02	02/03/84	39.83	35.43	35.24	37.50	1.13	3.10	1.06	10.60	2.40
3-B-03	02/03/84	14.70	11.53	12.14	12.88	1.21	1.56	1.14	20.20	4.22
3-B-04	02/03/84	18.59	35.05	35.07	29.98	0.53	1.19	0.62	28.00	5.12
3-B-05	02/03/84	42.14	35.49	36.01	22.69	1.17	2.92	1.86	41.80	8.03
3-B-06	02/03/84	23.29	35.57	35.28	37.88	0.66	2.48	0.61	54.00	10.81
3-B-07	02/03/84	47.62	35.21	35.53	32.61	1.34	2.02	1.46	64.20	13.32
3-B-08	02/03/84	53.98	34.94	35.05	35.87	1.54	2.33	1.50	72.90	16.39
3-B-09	02/03/84	27.83	35.28	35.67	35.72	0.78	1.53	0.78	82.80	19.21
3-B-10	02/03/84	75.22	35.30	36.16	37.00	2.08	3.68	2.03	90.20	21.85
3-B-11	02/03/84	44.50	35.55	36.77	32.88	1.21	2.25	1.35	99.20	25.59
3-B-12	02/03/84	39.03	35.64	37.52	36.50	1.04	1.97	1.07	105.50	27.42
3-B-END	02/03/84	39.03							116.50	30.40
3-B-01	03/21/84	39.07	18.12	18.08	20.21	2.16	4.17	1.93	2.90	0.39
3-B-02	03/21/84	37.27	17.03	17.74	19.68	2.10	3.23	1.89	10.60	2.43
3-B-03	03/21/84	71.65	35.22	36.00	37.36	1.99	3.52	1.92	20.20	6.07
3-B-04	03/21/84	12.91	34.89	36.88	35.40	0.35	0.98	0.36	28.00	8.36
3-B-05	03/21/84	39.38	35.41	33.94	20.90	1.16	2.80	1.88	41.80	10.86
3-B-06	03/21/84	13.35	35.24	33.37	37.50	0.40	1.86	0.36	54.00	13.10
3-B-07	03/21/84	25.97	34.97	35.09	35.64	0.74	1.97	0.73	64.20	14.49
3-B-08	03/21/84	51.44	35.81	37.27	34.53	1.38	3.14	1.49	72.90	16.83
3-B-09	03/21/84	35.66	35.61	35.65	36.22	1.00	2.35	0.98	82.80	19.82
3-B-10	03/21/84	66.26	35.97	36.20	37.00	1.83	3.39	1.79	90.20	22.44
3-B-11	03/21/84	33.21	35.29	34.95	32.86	0.95	2.16	1.01	99.20	25.55
3-B-12	03/21/84	34.67	35.62	35.74	36.54	0.97	1.86	0.95	105.50	27.04
3-B-END	03/21/84	34.67							116.50	29.69

EPHEMERAL GULLIES
SITE-3, GULLY-C, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
3-C-01	02/03/84	18.13	6.13	6.89	11.75	2.63	4.13	1.54	21.50	1.35
3-C-02	02/03/84	58.47	13.30	13.79	20.98	4.24	7.10	2.79	32.40	4.25
3-C-03	02/03/84	265.56	35.57	36.32	48.85	7.31	10.57	5.44	46.50	20.12
3-C-END	02/03/84	265.56							126.50	167.64
3-C-01	03/21/84	22.66	7.03	7.65	13.86	2.96	4.55	1.63	21.50	1.69
3-C-02	03/21/84	97.70	19.91	19.93	27.16	4.90	9.11	3.60	32.40	6.24
3-C-03	03/21/84	224.24	35.42	36.22	47.04	6.19	10.07	4.77	46.50	22.00
3-C-END	03/21/84	224.24							126.50	146.56

EPHEMERAL GULLIES
SITE-3, GULLY-D, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
3-D-01	02/03/84	43.27	35.41	35.46	32.02	1.22	3.91	1.35	9.50	1.43
3-D-02	02/03/84	16.24	7.08	7.88	9.17	2.06	2.98	1.77	18.80	3.35
3-D-03	02/03/84	36.39	13.39	13.62	17.83	2.67	4.33	2.04	25.90	4.64
3-D-04	02/03/84	25.04	14.44	14.55	15.74	1.72	2.52	1.59	32.40	6.03
3-D-05	02/03/84	36.52	13.67	14.04	16.86	2.60	4.49	2.17	48.10	9.39
3-D-06	02/03/84	9.60	10.32	10.78	37.00	0.89	1.25	0.26	57.00	10.82
3-D-07	02/03/84	13.37	13.43	13.64	11.35	0.98	1.79	1.18	67.30	11.64
3-D-08	02/03/84	83.32	35.72	36.06	30.27	2.31	4.84	2.75	78.50	15.41
3-D-10	02/03/84	29.78	35.53	35.45	36.25	0.84	2.54	0.82	93.30	18.71
3-D-11	02/03/84	18.00	35.27	36.00	37.70	0.05	1.30	0.48	100.00	19.82
3-D-END	02/03/84	18.00							101.00	19.95
3-D-01	03/21/84	28.48	10.40	10.87	14.61	2.62	3.72	1.95	9.50	0.94
3-D-02	03/21/84	35.22	13.87	13.86	17.93	2.54	5.25	1.96	18.80	3.00
3-D-03	03/21/84	58.78	19.84	20.62	21.14	2.85	5.02	2.78	25.90	5.32
3-D-04	03/21/84	31.73	18.13	18.55	19.40	1.71	2.94	1.64	32.40	7.36
3-D-05	03/21/84	57.60	15.43	16.74	23.07	3.44	6.04	2.50	48.10	12.23
3-D-06	03/21/84	63.38	34.93	35.80	38.50	1.77	3.20	1.65	57.00	15.96
3-D-08	03/21/84	83.67	35.78	35.90	38.37	2.33	5.31	2.18	78.50	21.68
3-D-09	03/21/84	52.44	35.73	37.19	36.66	1.41	2.94	1.43	84.90	24.71
3-D-10	03/21/84	2.82	35.32	47.00	35.88	0.06	1.06	0.08	93.30	26.32
3-D-11	03/21/84	1.07	35.53	35.66	36.16	0.03	0.78	0.03	100.00	26.41
3-D-END	03/21/84	1.07							101.00	26.42

EPHEMERAL GULLIES
SITE-3, GULLY-E, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
3-E-01	02/03/84	7.16	35.57	35.79	20.77	0.20	1.26	0.34	5.50	0.14
3-E-02	02/03/84	30.95	35.36	34.38	37.50	0.90	3.55	0.83	16.80	1.63
3-E-03	02/03/84	66.02	35.67	35.68	35.14	1.85	3.16	1.88	23.70	3.96
3-E-04	02/03/84	105.89	35.67	35.41	38.21	2.99	4.73	2.77	41.00	14.28
3-E-05	02/03/84	111.82	35.32	34.83	39.31	3.21	6.03	2.84	55.50	25.24
3-E-06	02/03/84	68.50	35.53	35.67	36.79	1.92	3.37	1.86	64.80	31.06
3-E-07	02/03/84	56.02	35.54	35.91	36.31	1.56	2.86	1.54	74.70	35.35
3-E-END	02/03/84	56.02							97.80	39.31
3-E-01	03/21/84	0.00	34.21	34.38	34.59	-0.27	0.30	0.00	5.50	0.00
3-E-02	03/21/84	47.87	18.14	18.13	19.92	2.64	4.24	2.40	16.80	1.88
3-E-03	03/21/84	47.09	34.86	35.14	36.38	1.34	1.84	1.29	23.70	4.15
3-E-04	03/21/84	79.21	35.22	37.36	41.99	2.12	4.41	1.89	41.00	11.74
3-E-05	03/21/84	124.24	35.26	34.41	36.86	3.61	6.23	3.37	55.50	21.98
3-E-06	03/21/84	66.85	35.25	35.37	35.83	1.89	3.10	1.87	64.80	28.15
3-E-07	03/21/84	24.25	35.76	35.14	36.50	0.69	2.10	0.66	74.70	31.28
3-E-08	03/21/84	103.71	35.02	35.51	38.65	2.92	5.96	2.68	87.60	37.01
3-E-END	03/21/84	103.71							97.80	44.35

EPHEMERAL GULLIES
SITE-4, GULLY-A, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
4-A-01	01/05/84	4.99	34.55	35.64	35.50	0.14	1.35	0.14	0.00	0.00
4-A-02	01/05/84	59.66	18.43	19.00	22.00	3.14	5.19	2.71	8.00	1.80
4-A-03	01/05/84	66.02	24.92	24.72	27.33	2.67	4.14	2.42	19.00	6.59
4-A-04	01/05/84	21.36	34.20	36.82	36.99	0.58	2.28	0.58	28.00	9.32
4-A-05	01/05/84	66.40	33.93	34.05	33.09	1.95	3.90	2.01	35.00	11.45
4-A-06	01/05/84	75.08	32.36	31.54	45.83	2.38	7.72	1.64	45.00	16.36
4-A-07	01/05/84	44.21	33.74	33.49	35.50	1.32	3.29	1.25	58.00	21.74
4-A-08	01/05/84	71.59	34.49	34.25	36.26	2.09	4.62	1.97	68.00	25.76
4-A-09	01/05/84	24.13	33.56	33.05	30.84	0.73	2.39	0.78	78.00	29.09
4-A-10	01/05/84	14.93	33.80	32.45	30.49	0.46	1.15	0.49	89.00	30.58
4-A-11	01/05/84	4.96	34.85	35.42	35.85	0.14	0.69	0.14	98.00	31.20
4-A-END	01/05/84	4.96							116.00	31.82
4-A-01	02/03/84	8.61	34.93	33.11	35.69	0.26	1.55	0.24	0.00	0.00
4-A-02	02/03/84	95.58	35.41	35.13	27.69	2.72	7.16	3.45	8.00	2.90
4-A-03	02/03/84	90.49	35.51	35.48	29.69	2.55	5.83	3.05	19.00	10.00
4-A-04	02/03/84	13.42	34.92	33.54	22.48	0.40	2.32	0.60	28.00	13.25
4-A-05	02/03/84	88.37	35.12	33.72	39.25	2.62	6.11	2.25	35.00	15.72
4-A-06	02/03/84	78.61	35.36	36.39	31.58	2.16	7.38	2.49	45.00	21.52
4-A-07	02/03/84	81.37	35.41	33.76	34.94	2.41	5.60	2.33	58.00	28.74
4-A-08	02/03/84	31.02	35.77	36.92	39.95	0.84	3.78	0.78	68.00	32.64
4-A-09	02/03/84	16.80	35.31	34.28	35.55	0.49	2.03	0.47	78.00	34.30
4-A-10	02/03/84	7.41	35.35	32.21	38.75	0.23	1.27	0.19	89.00	35.23
4-A-11	02/03/84	0.00	35.62	36.34	36.50	-0.23	0.76	0.00	98.00	35.46
4-A-END	02/03/84	0.00							116.00	35.46
4-A-01	03/16/84	27.00	34.69	35.06	35.53	0.77	2.60	0.76	0.00	0.00
4-A-02	03/16/84	114.58	19.35	20.42	28.76	5.61	0.13	3.98	8.00	3.94
4-A-03	03/16/84	67.72	22.28	22.40	40.00	3.01	4.04	1.69	19.00	10.90
4-A-04	03/16/84	20.94	35.36	34.89	23.60	0.60	2.29	0.89	28.00	13.67
4-A-05	03/16/84	87.01	32.84	32.71	37.50	2.66	6.52	2.32	35.00	16.29
4-A-06	03/16/84	137.71	21.79	22.53	31.67	6.11	9.35	4.35	45.00	24.09
4-A-07	03/16/84	96.62	34.86	34.02	39.39	2.84	5.93	2.45	58.00	34.66
4-A-08	03/16/84	44.97	35.02	35.40	39.00	1.27	3.95	1.15	68.00	39.58
4-A-09	03/16/84	20.05	34.67	35.17	35.50	0.57	2.17	0.56	78.00	41.83
4-A-10	03/16/84	28.26	34.54	34.88	35.91	0.81	1.74	0.79	89.00	43.68
4-A-11	03/16/84	0.00	35.03	34.64	36.13	-0.14	0.84	0.00	98.00	44.56
4-A-END	03/16/84	0.00							116.00	44.56
4-A-01	04/06/84	25.64	35.09	36.11	35.86	0.71	2.26	0.72	0.00	0.00
4-A-02	04/06/84	112.62	20.46	20.66	30.65	5.45	8.66	3.67	8.00	3.84
4-A-03	04/06/84	105.66	35.35	35.33	31.77	2.99	6.62	3.33	19.00	12.18
4-A-04	04/06/84	19.10	35.85	36.73	36.90	0.52	2.01	0.52	28.00	16.08

EPHEMERAL GULLIES
SITE-4, GULLY-A, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
4-A-05	04/06/84	104.58	35.94	36.18	24.00	2.89	6.75	4.36	35.00	19.09
4-A-06	04/06/84	121.84	35.79	35.11	35.71	3.47	8.28	3.41	45.00	26.95
4-A-07	04/06/84	123.87	36.04	36.53	38.15	38.15	3.39	3.25	58.00	38.03
4-A-08	04/06/84	29.23	36.12	39.49	34.61	6.56	3.23	0.84	68.00	43.35
4-A-09	04/06/84	27.49	35.81	34.79	37.32	0.79	2.76	0.74	78.00	45.32
4-A-10	04/06/84	20.98	35.69	36.17	35.00	0.58	1.18	0.60	89.00	47.17
4-A-11	04/06/84	1.19	35.67	39.66	34.00	0.03	0.89	0.03	98.00	47.87
4-A-END	04/06/84	1.19							116.00	48.01
4-A-01	04/27/84	22.42	36.06	36.16	36.99	0.62	2.10	0.61	0.00	0.00
4-A-02	04/27/84	122.56	22.40	22.82	31.71	5.37	9.81	3.87	8.00	4.03
4-A-03	04/27/84	98.29	35.88	36.00	30.23	2.73	5.87	3.25	19.00	12.46
4-A-04	04/27/84	23.03	35.67	35.43	34.93	0.65	2.01	0.66	28.00	16.26
4-A-05	04/27/84	109.83	35.98	36.00	32.00	3.05	6.80	3.43	35.00	19.49
4-A-06	04/27/84	103.50	18.73	18.95	23.10	5.46	7.22	4.48	45.00	26.90
4-A-07	04/27/84	72.14	19.23	19.81	19.98	3.64	5.36	3.61	58.00	34.83
4-A-08	04/27/84	41.97	36.25	36.81	39.35	1.14	3.31	1.07	68.00	38.79
4-A-09	04/27/84	28.67	35.80	36.29	37.54	0.79	3.07	0.76	78.00	41.24
4-A-10	04/27/84	23.50	35.97	36.15	37.10	0.65	1.44	0.63	89.00	43.23
4-A-11	04/27/84	2.71	36.05	38.71	36.74	0.07	1.00	0.07	98.00	44.05
4-A-END	04/27/84	2.71							116.00	44.39
4-A-01	05/08/84	10.00	11.33	11.76	10.86	0.85	1.30	0.92	0.00	0.00
4-A-02	05/08/84	103.57	18.01	19.39	26.25	5.34	8.70	3.95	8.00	3.15
4-A-03	05/08/84	107.34	34.80	35.30	30.83	3.04	6.56	3.48	19.00	11.20
4-A-04	05/08/84	20.19	35.59	34.81	36.65	0.58	2.07	0.55	28.00	15.19
4-A-05	05/08/84	102.65	26.58	27.22	32.03	3.77	6.94	3.20	35.00	18.17
4-A-06	05/08/84	131.23	21.90	22.66	31.96	5.79	8.89	4.11	45.00	26.29
4-A-07	05/08/84	112.21	35.54	36.91	33.23	3.04	6.68	3.38	58.00	37.28
4-A-08	05/08/84	58.45	35.32	36.99	39.38	1.58	3.55	1.48	68.00	43.20
4-A-09	05/08/84	26.21	34.52	33.60	35.94	0.78	2.83	0.73	78.00	46.14
4-A-10	05/08/84	18.86	35.66	34.92	36.35	0.54	1.14	0.52	89.00	47.86
4-A-11	05/08/84	4.72	35.85	39.33	36.34	0.12	1.01	0.13	98.00	48.60
4-A-END	05/08/84	4.72							116.00	49.20

EPHEMERAL GULLIES
SITE-4, GULLY-B, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
4-B-01	01/05/84	40.01	31.62	31.01	33.63	1.29	2.59	1.19	0.00	0.00
4-B-02	01/05/84	36.01	35.26	34.62	37.45	1.04	3.63	0.96	8.00	2.11
4-B-03	01/05/84	14.26	35.21	37.52	36.80	0.38	1.79	0.39	16.00	3.51
4-B-04	01/05/84	18.92	35.31	34.40	31.09	0.55	1.93	0.61	25.00	4.54
4-B-05	01/05/84	92.91	35.04	34.79	37.57	2.67	7.04	2.47	33.00	7.65
4-B-06	01/05/84	75.31	35.61	35.35	27.80	2.13	5.88	2.71	40.00	11.74
4-B-07	01/05/84	64.60	35.27	35.69	37.18	1.81	4.25	1.74	48.00	15.62
4-B-08	01/05/84	70.40	35.60	35.02	26.06	2.01	5.51	2.70	56.00	19.38
4-B-09	01/05/84	7.44	35.09	37.20	26.57	0.20	0.72	0.28	64.00	21.54
4-B-10	01/05/84	22.08	35.27	33.96	16.87	0.65	2.06	1.31	73.00	22.46
4-B-11	01/05/84	35.34	35.23	37.99	24.22	0.93	2.48	1.46	82.00	24.25
4-B-12	01/05/84	72.74	35.55	33.83	35.18	2.15	5.97	2.07	88.00	26.50
4-B-13	01/05/84	112.40	34.62	34.06	43.27	3.30	6.91	2.60	94.00	30.36
4-B-14	01/05/84	118.90	35.28	35.49	43.49	3.35	7.85	2.73	105.00	39.20
4-B-15	01/05/84	51.19	35.52	34.82	31.52	1.47	2.93	1.62	114.00	44.51
4-B-16	01/05/84	152.48	35.37	34.65	44.19	4.40	8.24	3.45	123.00	50.88
4-B-17	01/05/84	111.73	35.86	36.15	41.39	3.09	7.12	2.70	131.00	58.22
4-B-18	01/05/84	70.87	35.44	34.91	25.65	2.03	5.40	2.76	143.00	65.82
4-B-19	01/05/84	56.97	35.59	35.60	37.83	1.60	4.04	1.51	151.00	69.38
4-B-20	01/05/84	53.32	35.29	35.78	36.51	1.49	2.17	1.46	161.00	73.21
4-B-21	01/05/84	50.46	35.61	34.32	38.51	1.47	3.69	1.31	171.00	76.81
4-B-22	01/05/84	57.49	35.25	35.70	37.83	1.61	2.85	1.52	179.00	79.80
4-B-END	01/05/84	57.49							190.00	84.19
4-B-01	02/03/84	33.04	20.84	20.91	20.84	1.58	3.19	1.59	0.00	0.00
4-B-02	02/03/84	47.34	35.50	35.32	36.50	1.34	3.03	1.30	8.00	2.23
4-B-03	02/03/84	12.02	14.22	13.97	11.36	0.86	2.10	1.06	16.00	3.88
4-B-04	02/03/84	17.40	13.15	12.98	13.77	1.34	2.14	1.26	25.00	4.80
4-B-05	02/03/84	57.63	19.74	20.43	23.08	2.82	6.25	2.50	33.00	6.88
4-B-06	02/03/84	94.23	35.47	35.29	39.24	2.67	5.84	2.40	40.00	10.57
4-B-07	02/03/84	78.45	35.65	35.65	29.27	2.20	6.30	2.68	48.00	15.37
4-B-08	02/03/84	49.67	35.66	35.73	24.69	1.39	3.32	2.01	56.00	18.93
4-B-09	02/03/84	0.00	35.43	34.94	45.85	-0.18	0.27	0.00	64.00	20.31
4-B-10	02/03/84	36.89	35.25	34.80	24.48	1.06	3.84	1.51	73.00	21.46
4-B-11	02/03/84	34.60	19.01	18.90	13.91	1.83	3.46	2.49	82.00	23.69
4-B-12	02/03/84	62.76	16.71	16.82	21.78	3.73	6.23	2.88	88.00	25.72
4-B-13	02/03/84	139.56	35.40	35.33	42.80	3.95	8.10	3.26	94.00	29.93
4-B-14	02/03/84	117.58	24.64	25.61	30.71	4.59	6.35	3.83	105.00	39.76
4-B-15	02/03/84	68.66	35.62	35.57	33.37	1.93	4.37	2.06	114.00	45.58
4-B-16	02/03/84	174.91	35.59	35.84	42.79	4.88	7.73	4.09	123.00	53.19
4-B-17	02/03/84	167.26	35.93	35.96	42.94	4.65	8.92	3.90	131.00	62.70
4-B-18	02/03/84	89.84	35.36	35.50	39.79	2.53	5.03	2.26	143.00	73.42
4-B-19	02/03/84	62.32	35.07	35.61	38.18	1.75	3.64	1.63	151.00	77.65

EPHEMERAL GULLIES
SITE-4, GULLY-B, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
4-B-20	02/03/84	49.96	35.50	35.68	36.43	1.40	2.59	1.37	161.00	81.55
4-B-21	02/03/84	29.66	35.60	34.89	37.91	0.85	2.89	0.78	171.00	84.31
4-B-22	02/03/84	40.23	35.29	34.98	37.51	1.15	3.44	1.07	179.00	86.25
4-B-END	02/03/84	40.23							190.00	89.32
4-B-01	03/16/84	47.33	35.22	34.05	24.67	1.39	3.45	1.92	0.00	0.00
4-B-02	03/16/84	41.85	35.38	33.75	36.50	1.24	3.28	1.15	8.00	2.48
4-B-03	03/16/84	36.90	34.62	36.89	36.70	1.00	3.61	1.01	16.00	4.67
4-B-04	03/16/84	32.66	16.54	17.01	17.35	1.92	2.80	1.88	25.00	6.84
4-B-05	03/16/84	61.24	15.78	16.07	22.50	3.81	6.23	2.72	33.00	9.45
4-B-06	03/16/84	123.88	34.95	35.49	42.32	3.49	7.38	2.93	40.00	13.95
4-B-07	03/16/84	97.52	34.90	35.46	32.41	2.75	7.21	3.01	48.00	20.09
4-B-08	03/16/84	53.96	33.87	35.26	24.46	1.53	3.71	2.21	56.00	24.30
4-B-09	03/16/84	4.30	34.45	33.07	27.09	0.13	1.09	0.16	64.00	25.92
4-B-10	03/16/84	37.92	12.78	13.30	15.30	2.85	4.43	2.48	73.00	27.24
4-B-11	03/16/84	64.62	22.93	23.49	23.01	2.75	4.73	2.81	82.00	30.45
4-B-12	03/16/84	71.88	35.07	37.24	30.62	1.93	6.40	2.35	88.00	33.29
4-B-13	03/16/84	158.37	34.34	35.03	42.90	4.52	8.34	3.69	94.00	38.09
4-B-14	03/16/84	141.68	23.26	25.43	32.95	5.57	6.91	4.30	105.00	49.55
4-B-15	03/16/84	97.97	34.90	35.65	33.78	2.75	5.57	2.90	114.00	57.04
4-B-16	03/16/84	215.88	34.75	35.97	44.51	6.00	9.13	4.85	123.00	66.84
4-B-17	03/16/84	169.22	34.76	35.10	43.39	4.82	9.11	3.90	131.00	77.54
4-B-18	03/16/84	135.31	34.56	35.23	39.80	3.84	6.69	3.40	143.00	90.23
4-B-19	03/16/84	52.42	19.49	20.31	19.22	2.58	4.12	2.73	151.00	95.44
4-B-20	03/16/84	60.92	33.50	34.41	36.01	1.77	2.75	1.69	161.00	99.38
4-B-21	03/16/84	62.46	34.46	36.31	37.17	1.72	4.44	1.68	171.00	103.66
4-B-22	03/16/84	93.53	34.50	34.89	37.86	2.68	3.95	2.47	179.00	108.00
4-B-END	03/16/84	93.53							190.00	115.15
4-B-01	04/06/84	34.02	35.43	34.71	23.24	0.98	2.99	1.46	0.00	0.00
4-B-02	04/06/84	37.46	35.26	38.61	36.50	0.97	2.96	1.03	8.00	1.98
4-B-03	04/06/84	23.74	15.52	15.21	14.11	1.56	2.76	1.68	16.00	3.68
4-B-04	04/06/84	30.18	18.65	18.62	13.73	1.62	2.45	2.20	25.00	5.37
4-B-05	04/06/84	51.28	15.39	15.77	20.19	3.25	5.24	2.51	33.00	7.64
4-B-06	04/06/84	123.12	36.05	36.64	42.30	3.36	6.77	2.91	40.00	11.87
4-B-07	04/06/84	113.47	35.51	36.48	32.52	3.11	7.76	3.49	48.00	18.45
4-B-09	04/06/84	19.71	13.36	13.50	14.60	1.46	2.34	1.35	64.00	22.15
4-B-10	04/06/84	54.33	15.54	16.56	21.21	3.28	5.23	2.56	73.00	24.46
4-B-11	04/06/84	78.40	35.80	36.12	26.58	2.17	4.84	2.95	82.00	28.60
4-B-13	04/06/84	158.24	27.73	28.51	35.67	5.55	8.46	4.44	94.00	33.53
4-B-14	04/06/84	179.89	35.51	36.86	44.98	4.88	8.25	4.00	105.00	46.45
4-B-15	04/06/84	87.94	28.47	29.31	31.43	3.00	5.16	2.80	114.00	54.82
4-B-16	04/06/84	213.82	30.63	32.20	39.76	6.64	9.13	5.38	123.00	64.25

EPHEMERAL GULLIES
SITE-4, GULLY-B, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
4-B-17	04/06/84	162.94	35.90	36.12	40.94	4.51	8.15	3.98	131.00	74.72
4-B-18	04/06/84	130.54	35.96	36.26	38.65	3.60	6.53	3.38	143.00	86.95
4-B-19	04/06/84	65.56	35.14	36.22	30.24	1.81	4.23	2.17	151.00	92.40
4-B-20	04/06/84	89.65	35.61	36.59	36.00	2.45	3.60	2.49	161.00	97.79
4-B-21	04/06/84	66.95	36.02	35.99	38.37	1.86	4.57	1.74	171.00	103.23
4-B-22	04/06/84	86.57	29.39	29.85	31.55	2.90	4.21	2.74	179.00	107.49
4-B-END	04/06/84	86.57							190.00	114.10
4-B-01	04/27/84	35.13	35.81	34.78	24.08	1.01	2.97	1.46	0.00	0.00
4-B-02	04/27/84	43.25	35.77	35.16	36.74	1.23	2.90	1.18	8.00	2.18
4-B-03	04/27/84	41.62	35.74	36.19	37.67	1.15	3.47	1.10	16.00	4.53
4-B-04	04/27/84	0.00	35.69	33.42	36.50	-0.21	1.05	0.00	25.00	5.83
4-B-05	04/27/84	38.28	12.02	12.71	15.20	3.01	4.50	2.52	33.00	6.90
4-B-06	04/27/84	114.55	35.76	36.02	41.37	3.18	6.65	2.77	40.00	10.61
4-B-07	04/27/84	66.97	19.45	19.58	18.40	3.42	5.70	3.64	48.00	15.65
4-B-08	04/27/84	58.65	25.81	26.53	22.46	2.21	3.59	2.61	56.00	19.14
4-B-09	04/27/84	9.46	35.72	35.03	36.66	0.27	1.37	0.26	64.00	21.03
4-B-10	04/27/84	52.24	16.91	17.70	22.42	2.95	5.32	2.33	73.00	22.96
4-B-11	04/27/84	80.83	35.51	36.24	26.73	2.23	4.90	3.02	82.00	27.12
4-B-12	04/27/84	87.12	36.05	35.85	29.94	2.43	7.08	2.91	88.00	30.62
4-B-13	04/27/84	188.43	35.84	36.23	43.16	5.20	8.97	4.37	94.00	36.36
4-B-14	04/27/84	149.88	24.01	26.02	32.47	5.76	7.93	4.62	105.00	49.28
4-B-15	04/27/84	89.90	35.62	35.39	32.56	2.54	5.29	2.76	114.00	56.78
4-B-16	04/27/84	174.95	26.70	28.08	35.97	6.23	8.06	4.86	123.00	65.05
4-B-17	04/27/84	175.71	36.12	38.61	44.87	4.55	9.73	3.92	131.00	74.79
4-B-18	04/27/84	113.69	35.73	36.55	34.17	3.11	6.26	3.33	143.00	86.85
4-B-19	04/27/84	62.36	36.07	37.34	29.89	1.67	3.97	2.09	151.00	91.74
4-B-20	04/27/84	81.93	35.64	35.93	36.99	2.28	3.52	2.21	161.00	96.75
4-B-21	04/27/84	67.90	35.67	35.73	37.33	1.90	3.62	1.82	171.00	101.96
4-B-22	04/27/84	83.11	35.66	37.26	34.81	2.23	4.23	2.39	179.00	106.15
4-B-END	04/27/84	83.11							190.00	112.50
4-B-01	05/08/84	33.72	35.55	34.40	23.12	0.98	3.18	1.46	0.00	0.00
4-B-02	05/08/84	46.00	35.79	35.38	36.00	1.30	2.98	1.28	8.00	2.21
4-B-03	05/08/84	34.62	35.42	36.82	37.12	0.94	3.03	0.93	16.00	4.45
4-B-04	05/08/84	0.00	36.22	36.15	37.00	-0.32	0.90	0.00	25.00	5.53
4-B-05	05/08/84	53.75	15.41	14.97	20.13	3.59	5.26	2.67	33.00	7.02
4-B-06	05/08/84	116.12	24.81	25.86	31.29	4.49	7.08	3.71	40.00	11.15
4-B-07	05/08/84	101.06	26.84	27.53	32.30	3.67	7.11	3.13	48.00	17.18
4-B-08	05/08/84	62.95	24.12	24.30	24.04	2.59	5.38	2.62	56.00	21.73
4-B-09	05/08/84	6.00	35.80	37.50	36.27	0.16	0.86	0.17	64.00	23.65
4-B-10	05/08/84	54.94	16.53	17.33	22.07	3.17	4.98	2.49	73.00	25.56
4-B-11	05/08/84	56.28	22.40	22.60	23.21	2.49	4.16	2.42	82.00	29.04

EPHEMERAL GULLIES
SITE-4, GULLY-B, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
4-B-12	05/08/84	98.22	28.70	28.88	32.74	3.40	6.86	3.00	88.00	32.26
4-B-13	05/08/84	178.83	35.71	36.34	43.27	4.92	8.80	4.13	94.00	38.03
4-B-14	05/08/84	157.29	25.09	27.93	35.51	5.63	7.84	4.43	105.00	50.86
4-B-15	05/08/84	106.44	35.63	36.32	33.34	2.93	5.83	3.19	114.00	59.10
4-B-16	05/08/84	232.89	35.81	36.33	44.90	6.41	9.95	5.19	123.00	69.71
4-B-17	05/08/84	177.20	35.93	36.68	42.77	4.83	9.55	4.14	131.00	81.10
4-B-18	05/08/84	121.22	35.39	36.07	33.48	3.36	6.73	3.62	143.00	93.54
4-B-19	05/08/84	69.38	35.67	36.32	29.55	1.91	4.80	2.35	151.00	98.83
4-B-20	05/08/84	77.44	35.83	36.01	36.97	2.15	3.51	2.09	161.00	105.93
4-B-21	05/08/84	73.91	35.81	36.58	38.02	2.02	4.80	1.94	171.00	109.19
4-B-22	05/08/84	84.69	30.28	31.83	32.25	2.66	4.18	2.63	179.00	113.59
4-B-END	05/08/84	84.69							190.00	120.06

EPHEMERAL GULLIES
SITE-4, GULLY-C, CYCLE-2

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
4-C-01	01/05/84	40.02	35.72	35.73	26.19	1.12	3.41	1.53	0.00	0.00
4-C-02	01/05/84	21.54	35.48	34.74	36.63	0.62	1.82	0.59	7.00	1.50
4-C-03	01/05/84	13.03	35.53	35.21	21.77	0.37	1.72	0.60	14.00	2.34
4-C-04	01/05/84	8.34	35.57	36.26	36.33	0.23	1.42	0.23	20.00	2.78
4-C-05	01/05/84	29.40	35.48	35.85	37.00	0.82	2.26	0.79	29.00	3.96
4-C-END	01/05/84	29.40							33.00	4.78
4-C-01	02/03/84	44.17	21.54	20.08	21.53	2.00	4.09	2.05	0.00	0.00
4-C-02	02/03/84	14.44	35.43	37.05	23.58	0.39	1.52	0.61	7.00	1.42
4-C-03	02/03/84	9.61	35.36	34.32	21.07	0.28	1.39	0.46	14.00	2.01
4-C-04	02/03/84	13.85	35.45	35.51	36.27	0.39	1.24	0.38	20.00	2.50
4-C-05	02/03/84	44.96	35.41	35.40	34.20	1.27	3.44	1.31	29.00	4.33
4-C-END	02/03/84	44.96							33.00	5.58
4-C-01	03/16/84	41.64	18.81	20.01	20.83	2.08	3.68	2.00	0.00	0.00
4-C-02	03/16/84	23.87	34.91	32.25	25.50	0.74	3.04	0.94	7.00	1.59
4-C-03	03/16/84	9.51	34.73	35.22	33.26	0.27	1.20	0.29	14.00	2.40
4-C-04	03/16/84	14.22	35.31	35.54	35.87	0.40	1.42	0.40	20.00	2.90
4-C-05	03/16/84	28.61	34.88	35.32	27.78	0.81	2.32	1.03	29.00	4.24
4-C-END	03/16/84	28.61							33.00	5.04
4-C-01	04/06/84	42.49	18.96	19.31	22.33	2.20	3.97	1.90	0.00	0.00
4-C-02	04/06/84	33.94	35.92	36.10	24.39	0.94	3.06	1.39	7.00	1.86
4-C-03	04/06/84	11.35	13.75	13.84	14.50	0.82	1.95	0.78	14.00	2.96
4-C-04	04/06/84	14.39	36.16	37.86	36.50	0.38	1.29	0.39	20.00	3.50
4-C-05	04/06/84	32.87	35.68	36.52	18.45	0.90	2.07	1.78	29.00	4.97
4-C-END	04/06/84	32.87							33.00	5.89
4-C-01	04/27/84	38.86	35.69	35.00	20.21	1.11	3.49	1.92	0.00	0.00
4-C-02	04/27/84	50.49	35.92	35.30	26.70	1.43	3.30	1.89	7.00	2.17
4-C-03	04/27/84	16.93	35.43	35.27	36.23	0.48	1.98	0.47	14.00	3.81
4-C-04	04/27/84	17.50	35.40	36.45	35.98	0.48	1.43	0.49	20.00	4.53
4-C-05	04/27/84	26.58	35.99	36.41	27.63	0.73	1.68	0.96	29.00	5.92
4-C-END	04/27/84	26.58							33.00	6.66
4-C-01	05/08/84	44.24	19.40	19.92	20.91	2.22	3.66	2.12	0.00	0.00
4-C-02	05/08/84	38.65	21.67	21.96	23.05	1.76	3.07	1.68	7.00	2.01
4-C-03	05/08/84	8.35	11.71	11.59	12.27	0.72	1.36	0.68	14.00	3.15
4-C-04	05/08/84	14.45	16.81	16.80	17.17	0.86	1.45	0.84	20.00	3.63
4-C-05	05/08/84	40.62	35.85	36.59	18.71	1.11	2.03	2.17	29.00	5.35
4-C-END	05/08/84	40.62							33.00	6.47

EPHEMERAL GULLIES
SITE-1, GULLY-A, CYCLE-3

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
1-A-01	02/21/85	36.18	16.67	16.74	17.78	2.16	4.15	2.03	8.30	1.04
1-A-02	02/21/85	97.88	23.88	22.92	28.53	4.27	6.96	3.43	19.20	6.12
1-A-03	02/21/85	83.78	35.22	35.35	34.49	2.37	4.29	2.43	30.90	13.50
1-A-04	02/21/85	81.04	31.26	31.16	34.77	2.60	3.99	2.33	38.00	17.56
1-A-05	02/21/85	40.52	18.52	19.66	20.40	2.06	4.40	1.99	48.10	21.83
1-A-06	02/21/85	14.56	16.68	17.12	17.13	0.85	1.65	0.85	57.80	23.68
1-A-07	02/21/85	5.99	9.97	9.98	10.34	0.60	0.94	0.58	67.00	24.34
1-A-08	02/21/85	90.61	23.87	24.16	29.14	3.75	7.40	3.11	86.30	30.81
1-A-09	02/21/85	85.06	26.48	26.83	28.55	3.17	6.16	2.98	95.70	36.54
1-A-10	02/21/85	75.97	32.10	31.78	35.12	2.39	4.44	2.16	109.80	44.43
1-A-11	02/21/85	74.66	25.48	25.92	27.96	2.88	4.54	2.67	115.00	47.15
1-A-12	02/21/85	193.09	29.48	30.64	36.45	6.30	11.03	5.30	121.60	53.29
1-A-13	02/21/85	77.61	35.04	35.60	36.73	2.18	4.27	2.11	130.00	61.18
1-A-14	02/21/85	74.51	33.17	33.56	34.71	2.22	4.42	2.15	141.20	67.10
1-A-15	02/21/85	53.11	27.98	28.40	27.60	1.87	3.93	1.92	151.90	71.84
1-A-END	02/21/85	53.11							163.70	76.19
1-A-01	03/25/85	20.14	11.60	11.70	13.34	1.72	2.92	1.51	8.30	0.58
1-A-02	03/25/85	103.00	24.51	24.64	29.54	4.18	7.00	3.49	19.20	5.24
1-A-03	03/25/85	69.44	32.30	32.29	33.63	2.15	3.58	2.06	30.90	12.24
1-A-04	03/25/85	85.35	35.63	35.86	36.58	2.38	4.25	2.33	38.00	16.06
1-A-05	03/25/85	43.85	15.90	16.36	19.76	2.68	4.31	2.22	48.10	20.59
1-A-06	03/25/85	44.78	34.77	34.71	36.00	1.29	2.06	1.24	57.80	23.58
1-A-07	03/25/85	12.60	15.50	15.55	15.94	0.81	1.54	0.79	67.00	25.41
1-A-08	03/25/85	114.50	23.83	23.65	31.21	4.84	8.58	3.67	86.30	33.92
1-A-09	03/25/85	76.80	23.31	23.48	26.65	3.27	5.77	2.88	95.70	40.17
1-A-10	03/25/85	23.07	12.45	12.60	14.56	1.83	3.17	1.58	109.80	45.05
1-A-11	03/25/85	106.35	29.13	29.13	40.42	3.65	6.12	2.63	115.00	47.39
1-A-12	03/25/85	135.31	30.51	31.46	36.43	4.30	6.55	3.71	121.60	52.93
1-A-13	03/25/85	102.41	35.98	36.05	37.81	2.84	5.16	2.71	130.00	59.86
1-A-14	03/25/85	78.28	34.84	35.26	36.37	2.22	4.18	2.15	141.20	66.89
1-A-END	03/25/85	78.28							163.70	73.31
1-A-01	04/15/85	27.82	14.44	14.05	16.94	1.98	3.75	1.64	8.30	0.80
1-A-02	04/15/85	92.64	22.39	23.10	25.22	4.01	6.43	3.67	19.20	5.36
1-A-03	04/15/85	78.53	33.84	34.14	35.03	2.30	3.76	2.24	30.90	12.31
1-A-04	04/15/85	76.47	32.93	33.24	35.98	2.30	3.64	2.13	38.00	16.13
1-A-05	04/15/85	42.96	16.89	17.82	20.45	2.41	4.36	2.10	48.10	20.31
1-A-06	04/15/85	39.06	35.57	36.16	35.87	1.08	1.81	1.09	57.80	23.07
1-A-07	04/15/85	21.10	31.27	31.49	28.47	0.67	1.34	0.74	67.00	25.00
1-A-08	04/15/85	102.57	21.00	21.36	29.11	4.80	8.23	3.52	86.30	33.29
1-A-09	04/15/85	84.65	27.86	27.30	32.35	3.10	6.08	2.62	95.70	39.40
1-A-10	04/15/85	76.00	28.68	28.46	31.03	2.67	4.94	2.45	109.80	47.26

EPHEMERAL GULLIES
SITE-1, GULLY-A, CYCLE-3

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
1-A-11	04/15/85	108.27	30.11	29.99	37.45	3.61	6.43	2.89	115.00	50.59
1-A-12	04/15/85	100.68	29.17	29.87	33.34	3.37	4.90	3.02	121.60	55.38
1-A-13	04/15/85	66.14	28.95	29.39	30.78	2.25	3.93	2.15	130.00	60.24
1-A-14	04/15/85	66.14	29.96	29.74	31.81	2.22	3.94	2.08	141.20	65.38
1-A-15	04/15/85	48.96	19.41	20.14	21.23	2.43	4.11	2.31	151.90	69.66
1-A-END	04/15/85	48.96							163.70	73.67

EPHEMERAL GULLIES
SITE-1, GULLY-B, CYCLE-3

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
1-B-01	02/21/85	65.36	15.68	16.42	23.59	3.98	6.54	2.77	7.20	1.63
1-B-02	02/21/85	95.02	32.49	32.11	35.64	2.96	5.19	2.67	15.60	6.31
1-B-03	02/21/85	29.61	19.20	18.98	20.73	1.56	3.10	1.43	25.80	10.73
1-B-04	02/21/85	53.50	17.15	17.59	20.96	3.04	4.38	2.55	35.30	13.48
1-B-05	02/21/85	61.81	19.84	21.38	27.84	2.89	4.40	2.22	41.00	15.76
1-B-06	02/21/85	53.41	27.87	26.70	32.41	2.00	5.60	1.65	48.80	18.88
1-B-07	02/21/85	61.84	16.74	17.22	20.74	3.59	5.91	2.98	54.20	21.04
1-B-08	02/21/85	79.66	17.12	17.13	24.55	4.65	7.20	3.24	63.70	25.70
1-B-09	02/21/85	82.96	25.05	25.21	28.49	3.29	5.16	2.91	68.10	28.19
1-B-10	02/21/85	16.27	16.18	16.43	17.00	0.99	1.93	0.96	77.80	31.53
1-B-11	02/21/85	50.60	18.25	18.67	20.98	2.71	4.24	2.41	84.00	32.97
1-B-END	02/21/85	50.60							97.20	37.60
1-B-01	03/25/85	61.66	14.65	14.71	20.38	4.19	6.48	3.03	7.20	1.54
1-B-02	03/25/85	70.97	25.75	26.18	27.96	2.71	4.31	2.54	15.60	5.41
1-B-03	03/25/85	36.58	20.62	20.66	20.23	1.77	2.95	1.81	25.80	9.22
1-B-04	03/25/85	48.06	17.72	18.27	19.45	2.63	3.55	2.47	35.30	12.01
1-B-05	03/25/85	73.41	24.56	25.05	28.04	2.93	4.18	2.62	41.00	14.42
1-B-06	03/25/85	31.12	13.18	13.07	16.34	2.38	3.80	1.90	48.80	17.25
1-B-07	03/25/85	60.26	18.22	18.37	22.80	3.28	4.79	2.64	54.20	18.96
1-B-08	03/25/85	83.02	16.01	17.62	23.46	4.71	7.08	3.54	63.70	23.69
1-B-09	03/25/85	49.23	21.87	22.37	24.42	2.20	3.87	2.02	68.10	25.71
1-B-10	03/25/85	23.07	12.45	12.60	14.56	1.83	3.17	1.58	77.80	28.14
1-B-11	03/25/85	40.36	18.37	18.18	20.37	2.22	3.52	1.98	84.00	29.51
1-B-END	03/25/85	40.36							97.20	33.20
1-B-01	04/15/85	62.76	16.01	16.13	22.36	3.89	5.99	2.81	7.20	1.57
1-B-02	04/15/85	96.27	29.92	30.27	32.94	3.18	4.63	2.92	15.60	6.21
1-B-03	04/15/85	30.74	24.43	24.01	26.50	1.28	2.41	1.16	25.80	10.71
1-B-04	04/15/85	49.95	19.14	19.36	21.64	2.58	3.78	2.31	35.30	13.37
1-B-05	04/15/85	64.45	23.73	23.78	26.15	2.71	4.13	2.46	41.00	15.63
1-B-06	04/15/85	53.43	18.74	19.01	23.83	2.81	5.35	2.24	48.80	18.83
1-B-07	04/15/85	61.25	18.41	18.61	23.26	3.29	4.68	2.63	54.20	20.98
1-B-08	04/15/85	85.81	16.79	18.49	24.82	4.64	6.84	3.46	63.70	25.83
1-B-09	04/15/85	36.69	15.17	15.54	17.12	2.36	3.23	2.14	68.10	27.70
1-B-10	04/15/85	13.90	14.33	14.32	15.06	0.97	1.76	0.92	77.80	29.41
1-B-11	04/15/85	42.07	18.48	18.78	20.66	2.24	3.84	2.04	84.00	30.61
1-B-END	04/15/85	42.07							97.20	34.47

EPHEMERAL GULLIES
SITE-1, GULLY-C, CYCLE-3

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
1-C-01	02/21/85	56.90	19.77	20.24	21.94	2.81	4.86	2.59	1.30	0.26
1-C-02	02/21/85	51.55	16.82	16.68	21.80	3.09	5.00	2.36	7.50	2.59
1-C-03	02/21/85	47.77	20.69	21.32	27.01	2.24	3.52	1.77	12.00	4.14
1-C-04	02/21/85	16.58	35.41	36.04	35.86	0.46	0.97	0.46	21.60	6.29
1-C-05	02/21/85	30.88	20.53	20.31	21.87	1.52	2.71	1.41	30.00	7.67
1-C-06	02/21/85	49.13	24.56	25.19	24.44	1.95	3.13	2.01	40.20	10.50
1-C-07	02/21/85	68.77	16.89	17.45	21.59	3.94	8.07	3.19	53.10	15.78
1-C-08	02/21/85	79.76	22.18	22.27	26.28	3.58	5.62	3.04	60.70	19.71
1-C-09	02/21/85	61.47	21.85	22.35	24.55	2.75	4.01	2.50	67.80	23.19
1-C-10	02/21/85	64.46	18.67	18.57	24.75	3.47	6.59	2.60	77.90	27.61
1-C-11	02/21/85	71.95	22.59	23.20	26.45	3.10	5.65	2.72	86.10	31.49
1-C-12	02/21/85	54.66	17.05	16.81	21.84	3.25	5.77	2.50	89.20	32.86
1-C-END	02/21/85	54.66							97.80	36.13
1-C-01	03/25/85	58.76	19.60	19.98	20.12	2.94	4.81	2.92	1.30	0.27
1-C-02	03/25/85	54.85	17.32	17.24	21.71	3.18	4.73	2.53	7.50	2.71
1-C-03	03/25/85	38.41	20.17	19.59	20.01	1.96	2.97	1.92	12.00	4.17
1-C-04	03/25/85	20.07	35.45	35.83	35.82	0.56	1.05	0.56	21.60	6.12
1-C-04	03/25/85	24.21	35.29	35.60	35.85	0.68	1.25	0.68	21.60	7.59
1-C-05	03/25/85	22.76	16.85	17.24	17.84	1.32	2.28	1.28	30.00	8.96
1-C-06	03/25/85	58.49	28.18	28.25	27.29	2.07	3.33	2.14	40.20	11.84
1-C-07	03/25/85	54.22	15.77	15.71	19.09	3.45	6.14	2.84	53.10	16.89
1-C-08	03/25/85	73.38	22.13	22.30	25.93	3.29	4.92	2.83	60.70	20.26
1-C-09	03/25/85	41.04	18.46	18.57	20.64	2.21	3.05	1.99	67.80	23.08
1-C-10	03/25/85	57.49	18.17	18.48	23.13	3.11	5.78	2.49	77.90	26.53
1-C-11	03/25/85	66.90	19.17	19.67	23.83	3.40	6.00	2.81	86.10	30.08
1-C-END	03/25/85	66.90							97.80	34.08
1-C-01	04/29/85	65.28	18.90	18.75	23.52	3.48	4.94	2.78	1.30	0.29
1-C-02	04/29/85	48.18	16.91	16.96	20.88	2.84	4.19	2.31	7.50	2.74
1-C-03	04/29/85	46.67	22.35	23.10	24.26	2.02	3.06	1.92	12.00	4.22
1-C-05	04/29/85	20.74	20.29	20.33	21.19	1.02	2.14	0.98	30.00	6.19
1-C-06	04/29/85	55.27	26.35	26.70	26.47	2.07	3.30	2.09	40.20	8.88
1-C-07	04/29/85	49.33	15.27	14.81	18.67	3.33	6.12	2.64	53.10	13.57
1-C-08	04/29/85	82.70	25.15	25.68	29.28	3.22	5.56	2.82	60.70	17.05
1-C-09	04/29/85	67.30	25.01	25.30	27.62	2.66	3.78	2.44	67.80	20.75
1-C-10	04/29/85	61.59	18.86	19.80	23.66	3.21	5.85	2.60	77.90	25.27
1-C-11	04/29/85	102.01	26.16	27.34	30.00	3.73	6.24	3.40	86.10	29.93
1-C-12	04/29/85	78.26	21.25	21.44	27.27	3.65	6.81	2.87	89.20	31.86
1-C-END	04/29/85	78.26							97.80	36.53

EPHEMERAL GULLIES
SITE-1, GULLY-D, CYCLE-3

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
1-D-01	02/21/85	48.94	13.78	14.14	22.09	3.46	6.57	2.22	4.10	0.70
1-D-02	02/21/85	58.85	10.45	11.49	23.99	5.12	8.37	2.45	9.00	2.53
1-D-03	02/21/85	98.73	20.86	21.18	30.07	4.66	8.54	3.28	14.90	5.76
1-D-04	02/21/85	80.88	21.78	22.21	24.91	3.64	4.89	3.25	21.00	9.57
1-D-05	02/21/85	39.89	17.72	17.65	20.46	2.26	4.06	1.95	27.20	12.17
1-D-06	02/21/85	26.71	29.13	29.67	26.00	0.90	1.64	1.03	32.80	13.46
1-D-07	02/21/85	53.11	20.63	20.99	24.36	2.53	5.23	2.18	43.10	16.32
1-D-08	02/21/85	73.60	23.15	23.85	27.18	3.12	5.79	2.71	48.60	18.74
1-D-END	02/21/85	73.60							55.90	22.47
1-D-01	03/25/85	40.10	8.84	10.80	18.06	3.71	5.08	2.22	4.10	0.57
1-D-02	03/25/85	58.17	13.23	14.65	21.82	3.97	6.90	2.67	9.00	2.24
1-D-03	03/25/85	100.16	18.33	18.07	29.26	5.54	8.40	3.42	14.90	5.49
1-D-04	03/25/85	79.93	22.37	22.57	23.94	3.54	4.71	3.34	21.00	9.30
1-D-05	03/25/85	46.63	19.28	19.26	21.36	2.42	3.92	2.18	27.20	12.03
1-D-06	03/25/85	28.25	27.88	27.97	36.40	1.01	1.69	0.78	32.80	13.48
1-D-07	03/25/85	67.53	23.05	23.36	26.99	2.89	5.74	2.50	43.10	16.91
1-D-08	03/25/85	41.43	17.43	18.09	21.61	2.29	4.13	1.92	48.60	18.99
1-D-END	03/25/85	41.43							55.90	21.09
1-D-01	04/29/85	43.37	9.25	10.70	17.38	4.05	5.32	2.50	4.10	0.62
1-D-02	04/29/85	59.12	12.52	13.10	21.41	4.51	7.14	2.76	9.00	2.36
1-D-03	04/29/85	105.54	25.50	25.74	30.42	4.10	6.41	3.47	14.90	5.74
1-D-04	04/29/85	89.18	24.66	24.16	32.50	3.69	5.89	2.74	21.00	9.86
1-D-05	04/29/85	66.99	26.70	26.90	22.70	2.49	3.79	2.95	27.20	13.22
1-D-06	04/29/85	30.77	28.77	29.02	29.24	29.24	1.53	1.05	32.80	15.12
1-D-07	04/29/85	62.02	21.47	22.47	24.47	2.76	5.35	2.53	43.10	18.44
1-D-08	04/29/85	43.64	17.81	17.66	17.28	2.47	4.05	2.53	48.60	20.46
1-D-END	04/29/85	43.64							55.90	22.67

EPHEMERAL GULLIES
SITE-2, GULLY-A, CYCLE-3

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
2-A-01	02/20/85	48.85	22.76	23.94	21.58	2.04	4.02	2.26	153.60	1.08
2-A-02	02/20/85	101.24	14.60	16.32	30.61	6.20	10.65	3.31	147.20	4.63
2-A-03	02/20/85	130.48	24.39	24.07	32.87	5.42	9.95	3.97	140.40	8.49
2-A-04	02/20/85	151.17	23.01	25.06	33.06	6.03	9.25	4.57	135.60	14.16
2-A-05	02/20/85	84.23	29.27	28.94	33.59	2.91	5.24	2.51	129.80	20.70
2-A-06	02/20/85	73.25	19.64	20.34	24.21	3.60	5.19	3.03	121.80	25.95
2-A-07	02/20/85	70.63	21.95	22.63	23.84	3.12	5.26	2.96	112.20	28.85
2-A-08	02/20/85	100.53	28.41	27.61	33.51	3.64	6.54	3.00	106.40	33.36
2-A-09	02/20/85	78.07	29.69	29.79	31.73	2.62	4.20	2.46	98.80	38.45
2-A-10	02/20/85	28.36	28.82	29.54	30.10	0.96	2.05	0.94	90.60	43.10
2-A-11	02/20/85	56.53	26.21	26.17	27.84	2.16	3.39	2.03	78.00	46.35
2-A-12	02/20/85	52.76	30.17	30.49	28.74	1.73	3.01	1.84	67.00	49.92
2-A-13	02/20/85	94.62	34.04	33.43	37.19	2.83	5.72	2.54	57.60	55.24
2-A-14	02/20/85	223.03	32.77	32.32	41.99	6.90	11.70	5.31	47.20	58.54
2-A-15	02/20/85	208.63	34.63	35.66	41.52	5.85	9.55	5.02	44.20	77.13
2-A-16	02/20/85	107.87	29.81	29.23	35.12	3.69	7.87	3.07	31.80	86.80
2-A-17	02/20/85	112.37	20.38	21.31	29.22	5.27	8.36	3.85	23.00	104.39
2-A-END	02/20/85	112.37							160.20	109.54
2-A-01	03/25/85	42.76	19.20	19.70	21.33	2.17	3.88	2.00	153.60	0.95
2-A-02	03/25/85	90.82	11.65	15.03	29.07	6.04	10.01	3.12	147.20	4.11
2-A-03	03/25/85	155.17	26.85	25.82	38.14	6.03	11.30	4.07	140.40	8.21
2-A-04	03/25/85	174.60	25.37	27.02	39.50	6.46	9.22	4.42	135.60	14.85
2-A-05	03/25/85	36.37	20.15	20.09	23.51	1.81	3.40	1.55	129.80	20.71
2-A-06	03/25/85	101.30	24.67	25.26	28.67	4.01	5.56	3.53	121.80	25.30
2-A-07	03/25/85	86.63	24.15	24.96	26.98	3.47	5.57	3.21	112.20	29.08
2-A-07	04/15/85	77.61	22.33	23.16	24.51	3.35	5.28	3.17	112.20	32.39
2-A-08	03/29/85	49.00	17.71	16.95	21.35	2.89	5.14	2.30	106.40	35.73
2-A-09	03/25/85	67.34	26.61	26.40	28.78	2.55	3.90	2.34	98.80	39.04
2-A-10	03/25/85	3.96	5.53	5.49	36.00	0.72	1.10	0.11	90.60	42.17
2-A-11	03/25/85	31.09	21.93	21.89	22.64	1.42	2.34	1.37	78.00	43.51
2-A-12	03/25/85	57.11	28.15	27.85	27.44	2.05	2.98	2.08	67.00	46.39
2-A-13	03/25/85	87.04	31.87	31.65	34.51	2.75	5.26	2.52	57.60	51.60
2-A-14	03/25/85	156.64	25.21	26.01	31.81	6.02	9.68	4.92	47.20	54.13
2-A-15	03/25/85	161.10	30.74	31.96	36.71	5.04	7.87	4.39	44.20	67.82
2-A-16	03/25/85	70.76	18.63	18.57	23.40	3.81	6.41	3.02	31.80	74.90
2-A-17	03/25/85	120.28	22.76	24.29	29.41	4.96	8.74	4.09	23.00	90.15
2-A-END	03/25/85	120.28							160.20	95.66
2-A-01	04/15/85	50.81	25.53	25.92	26.57	1.96	3.99	1.91	153.60	1.13
2-A-02	04/15/85	94.47	15.78	16.48	30.31	5.73	10.40	3.12	147.20	4.56
2-A-03	04/15/85	147.23	25.90	26.33	36.57	5.59	10.63	4.03	140.40	8.59
2-A-04	04/15/85	172.08	27.85	29.46	55.00	5.84	9.50	3.13	135.60	15.02

EPHEMERAL GULLIES
SITE-2, GULLY-A, CYCLE-3

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
2-A-05	04/15/85	23.03	29.03	28.86	32.69	2.53	4.38	0.70	129.80	20.44
2-A-06	04/15/85	103.04	25.23	25.13	29.75	4.10	5.87	3.46	121.80	24.64
2-A-08	04/15/85	83.58	25.37	25.24	31.17	3.31	6.13	2.68	106.40	29.57
2-A-09	04/15/85	69.50	29.10	29.07	30.87	2.39	3.39	2.25	98.80	33.92
2-A-10	04/15/85	25.74	35.09	35.26	37.53	0.73	2.03	0.69	90.60	38.10
2-A-11	04/15/85	61.45	30.40	30.72	27.00	2.00	3.43	2.28	78.00	41.43
2-A-12	04/15/85	60.39	33.77	34.11	35.53	1.77	3.01	1.70	67.00	45.40
2-A-13	04/15/85	95.50	30.63	30.31	33.36	3.15	5.91	2.86	57.60	51.03
2-A-14	04/15/85	206.59	30.01	30.11	38.22	6.86	11.17	5.41	47.20	54.18
2-A-15	04/15/85	174.11	35.54	35.74	40.73	4.87	8.06	4.27	44.20	70.57
2-A-16	04/15/85	107.26	25.02	23.88	32.43	4.49	8.76	3.31	31.80	79.17
2-A-17	04/15/85	136.29	25.86	25.47	36.61	5.35	8.93	3.72	23.00	98.61
2-A-END	04/15/85	136.29							160.20	104.86

EPHEMERAL GULLIES
SITE-2, GULLY-B, CYCLE-3

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
2-B-01	02/20/85	73.71	19.10	18.99	24.32	3.88	6.66	3.03	38.40	2.15
2-B-02	02/20/85	59.02	26.41	25.54	28.72	2.31	4.48	2.06	30.00	4.82
2-B-03	02/20/85	42.96	22.81	23.09	24.09	1.86	3.39	1.78	24.20	7.80
2-B-04	02/20/85	42.89	35.71	36.04	38.24	1.19	2.83	1.12	15.80	10.96
2-B-05	02/20/85	58.89	34.24	34.23	35.80	1.72	3.89	1.64	5.20	12.79
2-B-END	02/20/85	58.89							49.80	17.46
2-B-01	03/25/85	72.72	20.25	20.95	24.35	3.47	5.02	2.99	38.40	2.12
2-B-02	03/25/85	23.25	15.62	16.27	16.94	1.55	2.78	1.37	30.00	4.05
2-B-03	03/25/85	25.85	19.36	20.35	20.44	1.27	2.74	1.26	24.20	5.48
2-B-04	03/25/85	18.50	12.34	12.75	13.61	1.45	2.01	1.36	15.80	7.12
2-B-05	03/25/85	13.39	13.59	13.52	14.53	0.99	1.90	0.92	5.20	7.69
2-B-END	03/25/85	13.39							49.80	8.75
2-B-01	04/15/85	94.79	32.09	32.46	37.24	2.92	6.78	2.55	38.40	2.76
2-B-02	04/15/85	54.49	35.89	35.84	38.19	1.52	3.90	1.43	30.00	5.77
2-B-03	04/15/85	37.39	2.20	22.52	23.27	1.66	2.97	1.61	24.20	8.45
2-B-04	04/15/85	74.93	29.03	29.61	31.28	2.53	3.86	2.40	15.80	12.58
2-B-05	04/15/85	37.06	27.63	27.86	28.41	1.33	2.70	1.30	5.20	14.60
2-B-END	04/15/85	37.06							49.80	17.53

EPHEMERAL GULLIES
SITE-2, GULLY-C, CYCLE-3

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
2-C-01	02/20/85	95.86	29.07	30.14	32.47	3.18	5.46	2.95	64.80	2.73
2-C-02	02/20/85	83.44	23.38	23.50	34.40	3.55	5.62	2.43	56.60	8.21
2-C-03	02/20/85	46.76	35.61	35.42	36.44	1.32	2.46	1.28	47.80	12.19
2-C-04	02/20/85	149.56	30.70	32.57	31.13	4.59	6.11	4.80	39.00	18.46
2-C-05	02/20/85	94.81	35.69	36.46	37.56	2.60	4.59	2.52	29.80	26.95
2-C-06	02/20/85	97.61	29.11	28.79	33.60	3.39	6.02	2.91	19.80	32.56
2-C-07	02/20/85	64.38	30.59	30.36	24.00	2.12	3.60	2.68	11.40	38.97
2-C-END	02/20/85	64.38							84.20	47.64
2-C-01	03/25/85	69.70	25.21	25.16	27.27	2.77	3.88	2.56	64.80	1.98
2-C-02	03/25/85	87.79	27.96	28.50	30.93	3.08	4.93	2.84	56.60	6.80
2-C-03	03/25/85	26.10	24.77	25.09	25.22	1.04	1.80	1.03	47.80	10.28
2-C-04	03/25/85	40.95	14.93	15.11	18.99	2.71	4.54	2.16	39.00	12.42
2-C-05	03/25/85	67.87	27.67	27.81	29.23	2.44	4.25	2.32	29.80	16.19
2-C-06	03/25/85	71.44	24.27	24.05	27.58	2.97	5.00	2.59	19.80	20.25
2-C-07	03/25/85	25.96	19.32	19.51	20.36	1.33	1.92	1.28	11.40	24.11
2-C-END	03/25/85	25.96							84.20	27.60
2-C-02	04/15/85	86.43	25.46	25.87	28.47	3.34	5.03	3.04	56.60	2.64
2-C-03	04/15/85	38.66	35.14	35.46	35.55	1.09	2.00	1.09	47.80	6.46
2-C-04	04/15/85	93.74	31.43	31.82	36.32	2.94	4.89	2.58	39.00	10.69
2-C-05	04/15/85	83.66	33.48	34.00	35.78	2.46	9.11	2.34	29.80	16.85
2-C-06	04/15/85	99.05	32.05	31.84	34.89	3.11	5.53	2.84	19.80	22.18
2-C-07	04/15/85	67.04	30.48	30.47	31.78	2.20	3.43	2.11	11.40	28.75
2-C-END	04/15/85	67.04							84.20	37.79

EPHEMERAL GULLIES
SITE-4, GULLY-A, CYCLE-3

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
4-A-01	02/22/85	50.83	24.65	25.03	28.76	2.03	3.98	1.77	21.40	3.78
4-A-02	02/22/85	48.25	17.85	17.54	20.47	2.75	3.82	2.36	28.50	6.22
4-A-03	02/22/85	41.78	16.30	16.44	19.02	2.54	3.39	2.20	33.00	7.63
4-A-04	02/22/85	27.04	15.42	15.72	16.97	1.72	3.08	1.59	42.60	9.92
4-A-05	02/22/85	21.49	14.34	15.13	13.45	1.42	2.79	1.60	50.70	11.29
4-A-06	02/22/85	31.06	20.00	2.03	21.38	1.53	2.47	1.45	59.70	12.93
4-A-07	02/22/85	26.74	24.97	25.22	25.80	1.06	2.06	1.04	67.00	14.39
4-A-08	02/22/85	23.70	15.07	16.23	17.62	1.46	2.94	1.35	81.70	16.97
4-A-09	02/22/85	66.72	25.95	25.86	28.20	2.58	3.94	2.37	95.00	21.15
4-A-10	02/22/85	99.63	26.14	26.63	31.58	3.74	5.99	3.15	105.00	26.93
4-A-11	02/22/85	173.11	31.51	32.60	32.31	5.31	7.95	5.36	114.10	35.54
4-A-12	02/22/85	57.29	26.51	5.92	28.86	2.21	4.66	1.99	124.60	43.94
4-A-13	02/22/85	110.37	29.81	30.65	34.21	3.60	5.75	3.23	137.50	51.45
4-A-14	02/22/85	48.35	15.69	16.38	19.57	2.95	4.65	2.47	146.10	56.19
4-A-15	02/22/85	51.59	23.45	23.88	20.45	2.16	3.92	2.52	153.20	58.65
4-A-16	02/22/85	14.99	19.18	18.97	14.67	0.79	1.88	1.02	165.00	61.39
4-A-17	02/22/85	21.66	20.00	19.69	21.20	1.10	1.97	1.02	171.60	62.22
4-A-[illegible]	02/22/85	24.68	20.74	20.91	21.80	1.18	2.08	1.13	178.50	63.33
4-A-END	02/22/85	24.68							185.80	64.57
4-A-01	03/22/85	34.09	15.53	15.92	17.94	2.14	3.63	1.90	21.40	2.54
4-A-02	03/22/85	62.53	21.43	21.12	24.37	2.96	4.55	2.57	28.50	4.92
4-A-03	03/22/85	38.25	19.20	19.22	19.15	1.99	3.30	2.00	33.00	6.49
4-A-04	03/22/85	30.23	21.15	20.84	22.19	1.45	2.85	1.36	42.60	8.78
4-A-05	03/22/85	50.39	31.63	31.89	34.65	1.58	2.12	1.45	50.70	11.05
4-A-06	03/22/85	27.56	20.89	21.19	21.53	1.30	2.17	1.28	59.70	13.48
4-A-07	03/22/85	16.65	20.48	20.55	21.15	0.81	1.12	0.79	67.00	14.60
4-A-08	03/22/85	29.70	19.67	20.06	20.88	1.49	2.55	1.43	81.70	16.98
4-A-09	03/22/85	66.39	25.76	25.83	28.34	2.57	4.41	2.34	95.00	21.43
4-A-10	03/22/85	87.81	31.43	31.47	34.64	2.79	4.78	2.53	105.00	26.79
4-A-11	03/22/85	133.23	33.93	34.42	33.49	3.87	7.12	3.98	114.10	33.77
4-A-12	03/22/85	78.75	34.03	34.38	36.16	2.29	4.16	2.18	124.60	41.50
4-A-13	03/22/85	132.29	34.82	35.18	38.69	3.76	5.98	3.40	137.50	50.95
4-A-15	03/22/85	73.59	32.80	33.75	25.09	2.18	4.89	2.93	153.20	56.03
4-A-16	03/22/85	42.66	35.30	34.96	26.94	1.22	2.55	1.58	165.00	60.79
4-A-17	03/22/85	8.83	11.99	11.61	13.05	0.76	0.92	0.68	171.60	61.97
4-A-18	03/22/85	35.33	23.34	24.53	24.61	1.44	2.76	1.44	178.50	63.03
4-A-END	03/22/85	35.33							185.80	64.81
4-A-01	04/29/85	37.61	19.23	18.99	21.30	1.98	3.68	1.77	21.40	2.79
4-A-02	04/29/85	77.63	25.94	26.13	28.99	2.97	4.64	2.68	28.50	5.63
4-A-03	04/29/85	67.47	23.93	23.92	26.37	2.82	4.59	2.56	33.00	7.90
4-A-04	04/29/85	31.16	22.30	21.77	23.53	1.43	2.84	1.32	42.60	11.19

EPHEMERAL GULLIES
SITE-4, GULLY-A, CYCLE-3

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
4-A-05	04/29/85	39.59	29.14	28.27	27.59	1.40	2.93	1.43	50.70	13.18
4-A-06	04/29/85	47.59	27.52	27.99	28.87	1.70	2.50	1.65	59.70	15.90
4-A-07	04/29/85	27.04	27.34	26.77	28.34	1.01	2.06	0.95	67.00	17.79
4-A-08	04/29/85	42.38	27.73	28.25	27.47	1.50	2.90	1.54	81.70	21.33
4-A-09	04/29/85	58.84	26.94	25.36	26.86	2.32	3.41	2.19	95.00	26.01
4-A-10	04/29/85	125.59	35.34	35.47	38.85	3.54	6.15	3.23	105.00	32.41
4-A-11	04/29/85	154.55	35.48	35.44	29.04	4.36	6.89	5.32	114.10	41.26
4-A-12	04/29/85	80.46	31.87	32.18	33.77	2.50	4.08	2.38	124.60	49.83
4-A-13	04/29/85	129.95	29.89	30.57	34.50	4.25	6.43	3.77	137.50	59.25
4-A-14	04/29/85	59.69	15.59	15.94	21.60	3.68	4.96	2.76	146.10	64.92
4-A-15	04/29/85	73.02	28.24	28.41	26.05	2.57	4.45	2.80	153.20	68.19
4-A-16	04/29/85	41.69	30.66	30.88	26.26	1.35	2.52	1.59	165.00	72.89
4-A-17	04/29/85	17.64	19.85	20.04	20.26	0.88	1.62	0.87	171.60	74.25
4-A-18	04/29/85	43.25	25.60	26.37	24.57	1.64	2.64	1.76	178.50	75.71
4-A-END	04/29/85	43.25							185.80	77.90

EPHEMERAL GULLIES
SITE-4, GULLY-B, CYCLE-3

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
4-B-01	02/22/85	10.88	8.80	8.57	10.00	1.17	2.35	1.09	11.50	0.44
4-B-02	02/22/85	32.29	13.99	15.23	16.70	2.12	3.18	1.93	18.50	1.49
4-B-03	02/22/85	57.59	20.58	20.71	25.26	2.78	5.68	2.28	28.00	4.45
4-B-04	02/22/85	51.16	21.01	21.86	21.75	2.34	4.59	2.35	33.50	6.53
4-B-05	02/22/85	44.54	19.18	19.70	19.63	2.63	4.05	2.27	41.50	9.18
4-B-06	02/22/85	56.03	21.43	24.04	29.92	2.33	5.63	1.87	50.00	12.15
4-B-07	02/22/85	67.03	30.16	30.46	32.57	2.20	4.23	2.06	54.50	13.03
4-B-08	02/22/85	61.34	35.84	37.40	30.58	1.64	4.61	2.01	67.80	15.86
4-B-09	02/22/85	19.29	35.54	35.72	21.10	0.54	2.35	0.91	75.00	17.87
4-B-10	02/22/85	44.35	30.32	30.94	24.41	1.43	2.35	1.82	84.40	19.95
4-B-11	02/22/85	27.51	23.07	22.73	24.32	1.21	2.42	1.13	91.50	21.72
4-B-END	02/22/85	27.51							101.80	23.69
4-B-01	03/22/85	10.84	8.89	8.95	10.42	1.21	1.78	1.04	11.50	0.43
4-B-02	03/22/85	27.83	13.94	14.19	14.91	1.96	2.96	1.87	18.50	1.37
4-B-03	03/22/85	72.24	21.90	22.43	27.49	3.22	6.25	2.63	28.00	4.67
4-B-04	03/22/85	53.90	18.82	19.04	22.13	2.83	4.79	2.44	33.50	7.08
4-B-05	03/22/85	43.67	18.49	18.50	18.38	2.36	3.55	2.38	41.50	9.79
4-B-06	03/22/85	47.27	13.65	13.62	20.50	3.47	4.93	2.31	50.00	12.47
4-B-07	03/22/85	67.66	31.28	31.17	33.40	2.17	3.46	2.03	54.50	14.26
4-B-08	03/22/85	104.23	33.41	34.51	37.68	3.02	5.78	2.77	67.80	22.20
4-B-09	03/22/85	30.31	24.93	25.25	23.70	1.20	2.70	1.28	75.00	25.57
4-B-10	03/22/85	41.97	35.30	35.87	30.08	1.17	2.18	1.40	84.40	27.92
4-B-11	03/22/85	18.82	19.70	19.40	20.97	0.97	1.68	0.90	91.50	29.42
4-B-END	03/22/85	18.82							101.80	30.77
4-B-01	04/29/85	26.63	17.62	17.79	18.68	1.44	2.56	1.43	11.50	1.06
4-B-02	04/29/85	39.50	21.76	21.76	21.94	1.80	3.00	1.80	18.50	2.67
4-B-03	04/29/85	79.58	21.47	21.39	27.19	3.72	7.12	2.93	28.00	6.60
4-B-04	04/29/85	94.90	28.45	28.49	29.88	3.33	6.63	3.18	33.50	9.93
4-B-05	04/29/85	37.85	20.98	21.26	19.99	1.78	2.86	1.89	41.50	13.62
4-B-06	04/29/85	71.81	20.80	21.05	25.76	3.41	5.11	2.79	50.00	16.86
4-B-07	04/29/85	11.95	17.60	17.83	18.05	0.67	1.15	0.66	54.50	18.17
4-B-08	04/29/85	33.56	19.85	19.97	18.13	1.68	2.71	1.85	67.80	20.27
4-B-09	04/29/85	31.91	20.80	21.27	21.05	1.50	2.57	1.52	75.00	21.91
4-B-10	04/29/85	30.54	27.35	28.01	28.00	1.09	1.96	1.09	84.40	23.95
4-B-11	04/29/85	20.21	26.30	26.24	25.53	0.77	1.17	0.79	91.50	25.20
4-B-END	04/29/85	20.21							101.80	26.64

EPHEMERAL GULLIES
SITE-4, GULLY-C, CYCLE-3

GULLY STATION	DATE	AREA (Sq. In.)	TOP WIDTH (In.)	MEAN WIDTH (In.)	WETTED PERIMETER (In.)	MEAN DEPTH (In.)	MAX DEPTH (In.)	HYDRAULIC RADIUS (In.)	CUMMULATIVE LENGTH (Ft.)	CUMMULATIVE VOLUME (Cubic Ft.)
4-C-01	02/22/85	27.64	15.82	16.35	17.55	1.69	3.13	1.57	2.00	0.19
4-C-02	02/22/85	24.93	14.05	15.10	14.31	1.65	2.31	1.74	9.50	1.56
4-C-03	02/22/85	25.80	11.22	11.72	14.04	2.20	3.91	1.84	15.00	2.53
4-C-04	02/22/85	31.44	14.74	15.26	17.59	2.06	3.72	1.79	20.50	3.62
4-C-05	02/22/85	20.26	14.83	15.58	16.46	1.30	2.02	1.23	27.50	4.88
4-C-END	02/22/85	20.26							35.00	5.93
4-C-01	03/22/85	23.30	15.34	15.43	16.42	1.51	2.67	1.42	2.00	0.16
4-C-02	03/22/85	26.27	18.08	18.24	13.38	1.44	2.20	1.96	9.50	1.45
4-C-03	03/22/85	18.79	14.65	15.65	15.59	1.20	2.07	1.21	15.00	2.31
4-C-04	03/22/85	35.08	15.28	15.31	18.05	2.29	3.23	1.94	20.50	3.34
4-C-05	03/22/85	11.90	9.55	9.51	9.84	1.25	1.87	1.21	27.50	4.48
4-C-END	03/22/85	11.90							35.00	5.11
4-C-01	04/29/85	29.27	20.44	20.75	21.29	1.41	2.33	1.37	2.00	0.20
4-C-02	04/29/85	34.75	21.95	21.99	20.40	1.58	2.66	1.70	9.50	1.87
4-C-03	04/29/85	22.62	14.24	14.78	15.64	1.53	2.41	1.45	15.00	2.96
4-C-04	04/29/85	33.02	16.22	16.84	18.17	1.96	3.04	1.82	20.50	4.02
4-C-05	04/29/85	23.16	21.58	21.84	22.21	1.06	2.08	1.04	27.50	5.39
4-C-END	04/29/85	23.16							35.00	6.60

Appendix E
Ephemeral Gully Soil Loss Calculations

SOIL LOST BY EPHEMERAL GULLIES
SITE-1, CYCLE-1

GULLY	DATE	LENGTH Feet	VOLUME Cubic Feet	SOIL WEIGHT Tons
A	03/10/83	173.10	235.05	10.57
A	04/18/83	173.10	238.72	10.74
B	03/10/83	93.20	105.80	4.76
B	04/18/83	93.20	106.27	4.78
C	03/10/83	123.50	134.90	6.07
C	04/18/83	123.50	144.00	6.48
D	03/10/83	67.00	105.02	4.72
D	04/18/83	67.00	103.15	4.64
TOTALS:		456.80	592.14	26.64

SOIL LOST BY EPHEMERAL GULLIES
SITE-2, CYCLE-1

GULLY	DATE	LENGTH Feet	VOLUME Cubic Feet	SOIL WEIGHT Tons
A	03/12/83	47.20	24.83	1.11
A	04/20/83	47.20	26.50	1.19
B	03/12/83	137.80	109.23	4.91
B	04/20/83	137.80	120.75	5.43
C	03/12/83	35.70	9.80	0.44
C	04/20/83	35.70	10.14	0.45
TOTALS:		220.70	157.39	7.08

SOIL LOST BY EPHEMERAL GULLIES
SITE-3, CYCLE-1

GULLY	DATE	LENGTH Feet	VOLUME Cubic Feet	SOIL WEIGHT Tons
A	03/08/83	43.20	21.11	0.94
B	03/08/83	100.20	73.22	3.29
C	03/08/83	44.00	56.96	2.56
D	03/09/83	60.00	75.79	3.41
E	03/09/83	59.80	46.02	2.07
TOTALS:		307.20	273.10	12.28

SOIL LOST BY EPHEMERAL GULLIES
SITE-4, CYCLE-1

GULLY	DATE	LENGTH Feet	VOLUME Cubic Feet	SOIL WEIGHT Tons
A	03/21/83	210.00	68.21	3.06
A	04/19/83	210.00	73.18	3.29
B	03/21/83	205.00	135.00	6.07
B	04/19/83	205.00	128.11	5.76
TOTALS:		415.00	201.29	9.05

SOIL LOST BY EPHEMERAL GULLIES
SITE-1, CYCLE-2

GULLY	DATE	LENGTH Feet	VOLUME Cubic Feet	SOIL WEIGHT Tons
A	10/05/83	167.80	33.96	1.52
A	02/02/84	167.80	84.51	3.80
A	03/23/84	167.80	88.21	3.96
A	04/05/84	167.80	93.52	4.20
A	04/25/84	167.80	88.42	3.97
A	05/03/84	167.80	82.19	3.69
B	10/05/83	62.00	24.45	1.10
B	02/02/84	62.00	36.44	1.63
B	03/23/84	62.00	44.18	1.98
B	04/05/84	62.00	39.59	1.78
B	04/25/84	62.00	41.76	1.87
B	05/03/84	62.00	47.99	2.15
C	10/05/83	92.20	26.95	1.21
C	02/02/84	92.20	46.87	2.10
C	03/23/84	92.20	45.37	2.04
C	04/05/84	92.20	48.39	2.17
C	04/25/84	92.20	56.45	2.54
C	05/03/84	92.20	54.52	2.45
D	10/05/83	56.30	16.75	0.75
D	02/02/84	56.30	18.30	0.82
D	03/23/84	56.30	20.59	0.92
D	04/05/84	56.30	21.65	0.97
D	04/25/84	56.30	20.23	0.91
D	05/03/84	56.30	24.00	1.08
TOTALS:		378.30	208.70	9.39

SOIL LOST BY EPHEMERAL GULLIES
SITE-2, CYCLE-2

GULLY	DATE	LENGTH Feet	VOLUME Cubic Feet	SOIL WEIGHT Tons
A	01/20/84	141.50	58.77	2.64
A	03/23/84	141.50	68.70	3.09
A	04/05/84	141.50	71.05	3.19
B	02/02/84	125.10	39.55	1.77
B	03/23/84	125.10	62.72	2.82
B	04/05/84	125.10	47.65	2.14
TOTALS:		266.60	118.70	5.34

SOIL LOST BY EPHEMERAL GULLIES
SITE-3, CYCLE-2

GULLY	DATE	LENGTH Feet	VOLUME Cubic Feet	SOIL WEIGHT Tons
A	02/03/84	119.00	40.96	1.84
A	03/21/84	119.00	33.12	1.49
B	02/03/84	116.50	30.40	1.36
B	03/21/84	116.50	29.69	1.33
C	02/03/84	126.50	167.64	7.54
C	03/21/84	126.50	146.56	6.59
D	02/03/84	101.00	19.95	0.89
D	03/21/84	101.00	26.42	1.18
E	02/03/84	97.80	39.31	1.76
E	03/21/84	97.80	44.35	1.99
TOTALS:		560.80	280.14	12.60

SOIL LOST BY EPHEMERAL GULLIES
SITE-4, CYCLE-2

GULLY	DATE	LENGTH Feet	VOLUME Cubic Feet	SOIL WEIGHT Tons
A	01/05/84	116.00	31.82	1.43
A	02/03/84	116.00	35.46	1.59
A	03/16/84	116.00	44.56	2.00
A	04/06/84	116.00	48.01	2.16
A	04/27/84	116.00	44.39	1.99
A	05/08/84	116.00	49.20	2.21
B	01/05/84	190.00	84.19	3.78
B	02/03/84	190.00	89.32	4.01
B	03/16/84	190.00	115.15	5.18
B	04/06/84	190.00	114.10	5.13
B	04/27/84	190.00	112.50	5.06
B	05/08/84	190.00	120.06	5.40
C	01/05/84	33.00	4.78	0.21
C	02/03/84	33.00	5.58	0.25
C	03/16/84	33.00	5.04	0.22
C	04/06/84	33.00	5.89	0.26
C	04/27/84	33.00	6.66	0.29
C	05/08/84	33.00	6.47	0.29
TOTALS:		339.00	175.73	7.90

SOIL LOST BY EPHEMERAL GULLIES
SITE-1, CYCLE-3

GULLY	DATE	LENGTH Feet	VOLUME Cubic Feet	SOIL WEIGHT Tons
A	02/21/85	163.70	76.19	3.42
A	03/25/85	163.70	73.31	3.29
A	04/15/85	163.70	73.67	3.31
B	02/21/85	97.20	37.60	1.69
B	03/25/85	97.20	33.20	1.49
B	04/15/85	97.20	34.47	1.55
C	02/21/85	97.80	36.13	1.62
C	03/25/85	97.80	34.08	1.53
C	04/29/85	97.80	36.53	1.64
D	02/21/85	55.90	22.47	1.01
D	03/25/85	55.90	21.09	0.94
D	04/29/85	55.90	22.67	1.02
TOTALS:		414.60	167.34	7.53

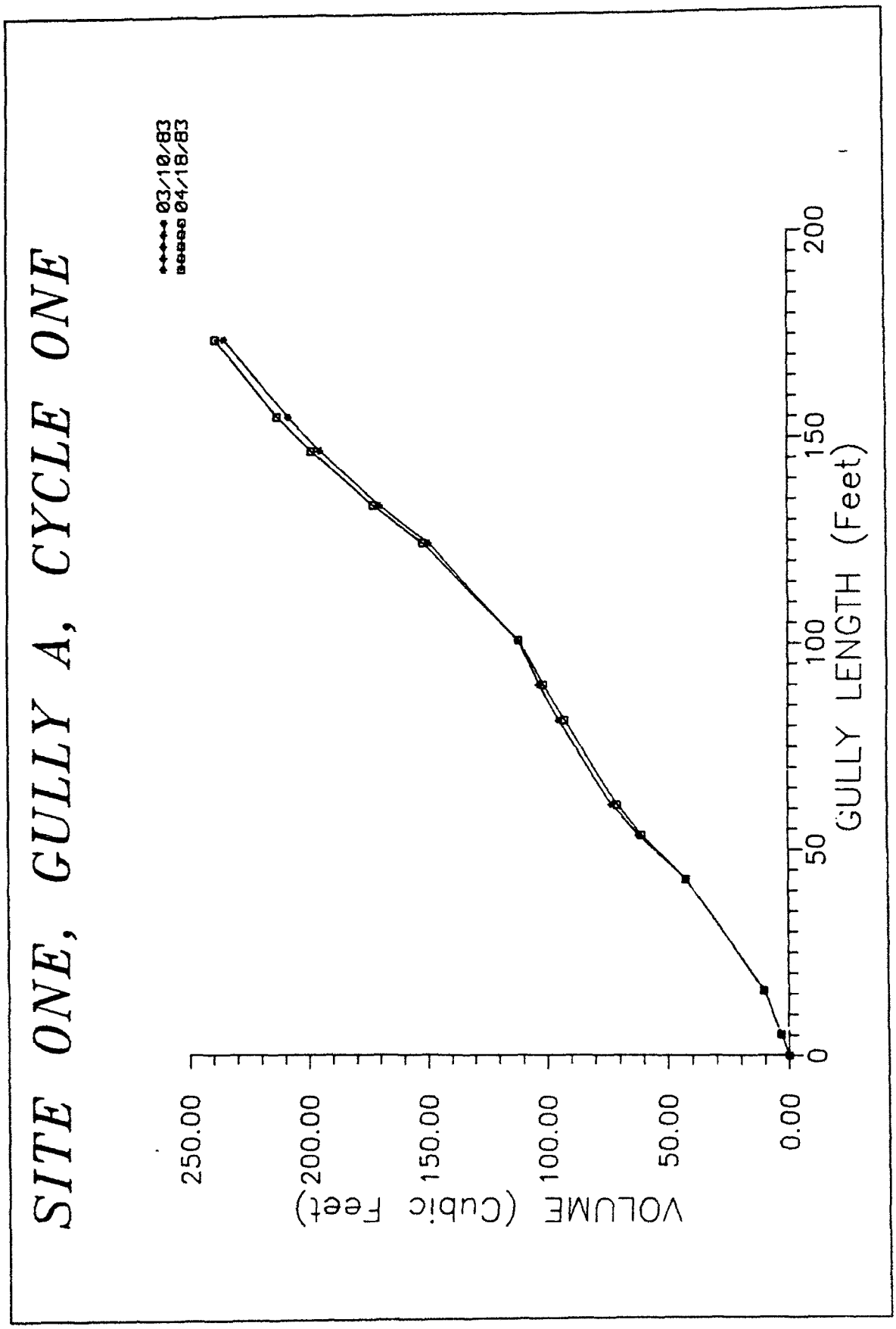
SOIL LOST BY EPHEMERAL GULLIES
SITE-2, CYCLE-3

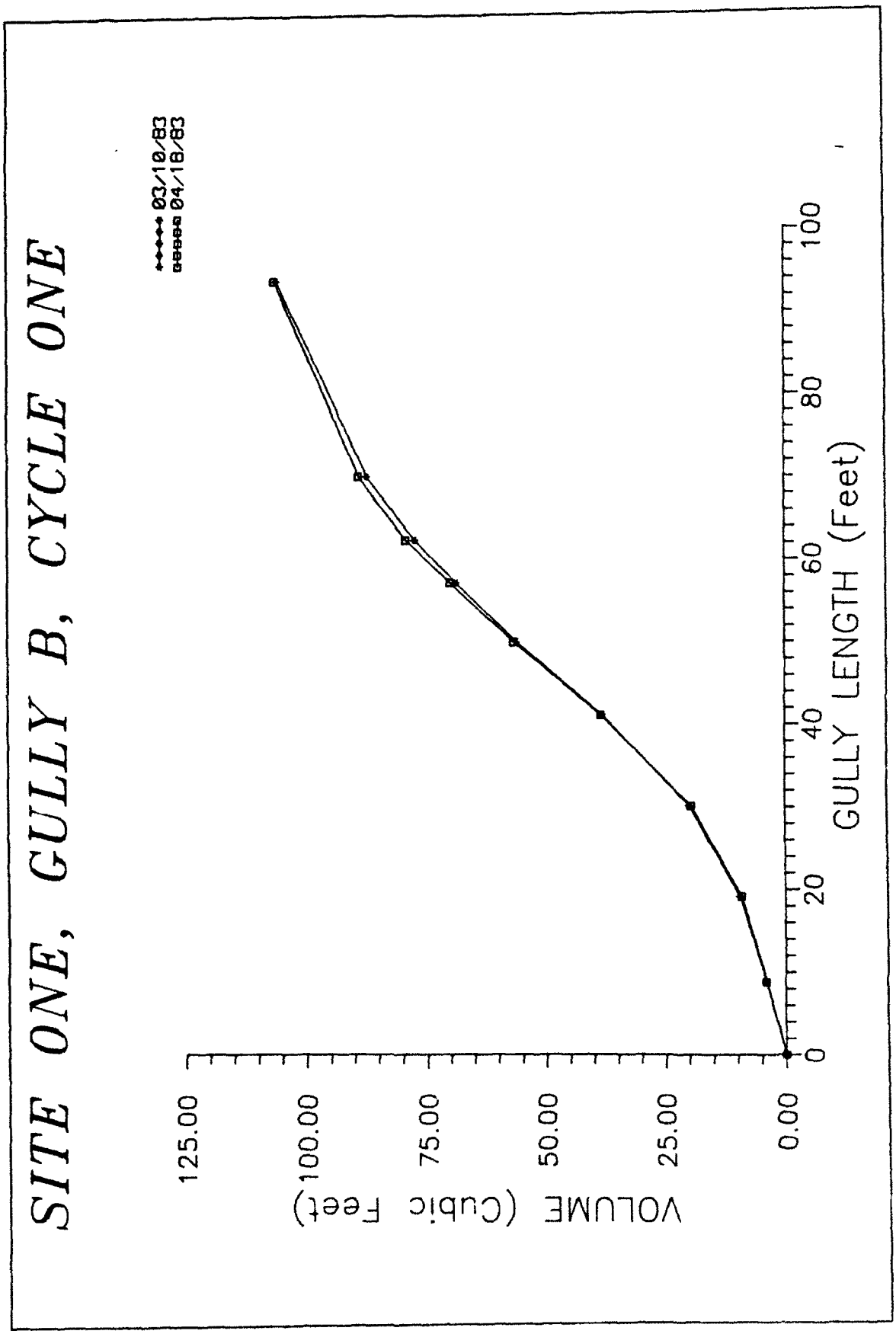
GULLY	DATE	LENGTH Feet	VOLUME Cubic Feet	SOIL WEIGHT Tons
A	02/20/85	160.20	109.54	4.92
A	03/25/85	160.20	95.66	4.30
A	04/15/85	160.20	104.86	4.71
B	02/20/85	49.80	17.46	0.78
B	03/25/85	49.80	8.75	0.39
B	04/15/85	49.80	17.53	0.78
C	02/20/85	84.20	47.64	2.14
C	03/25/85	84.20	27.60	1.24
C	04/15/85	84.20	37.79	1.70
TOTALS:		294.20	160.18	7.20

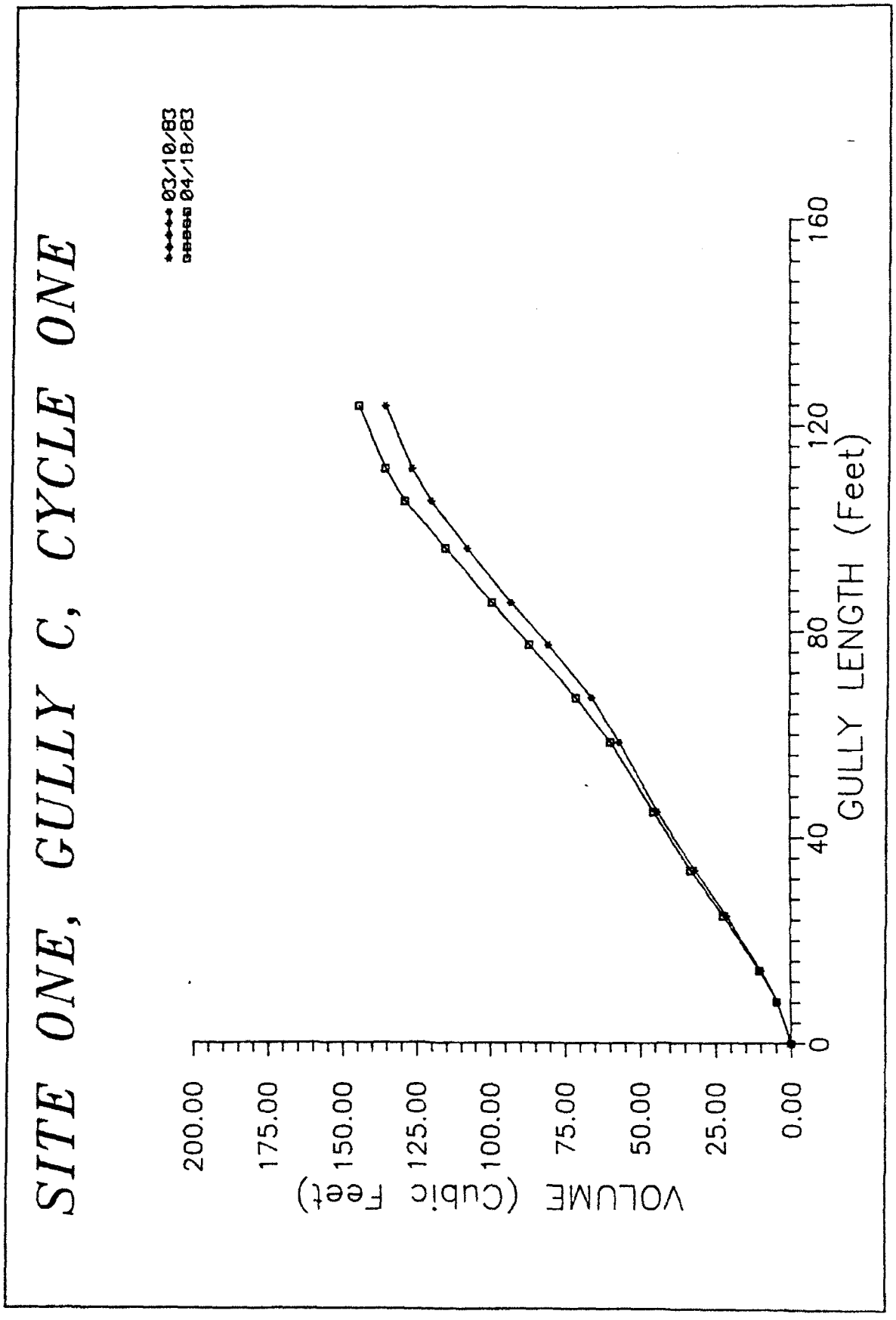
SOIL LOST BY EPHEMERAL GULLIES
SITE-4, CYCLE-3

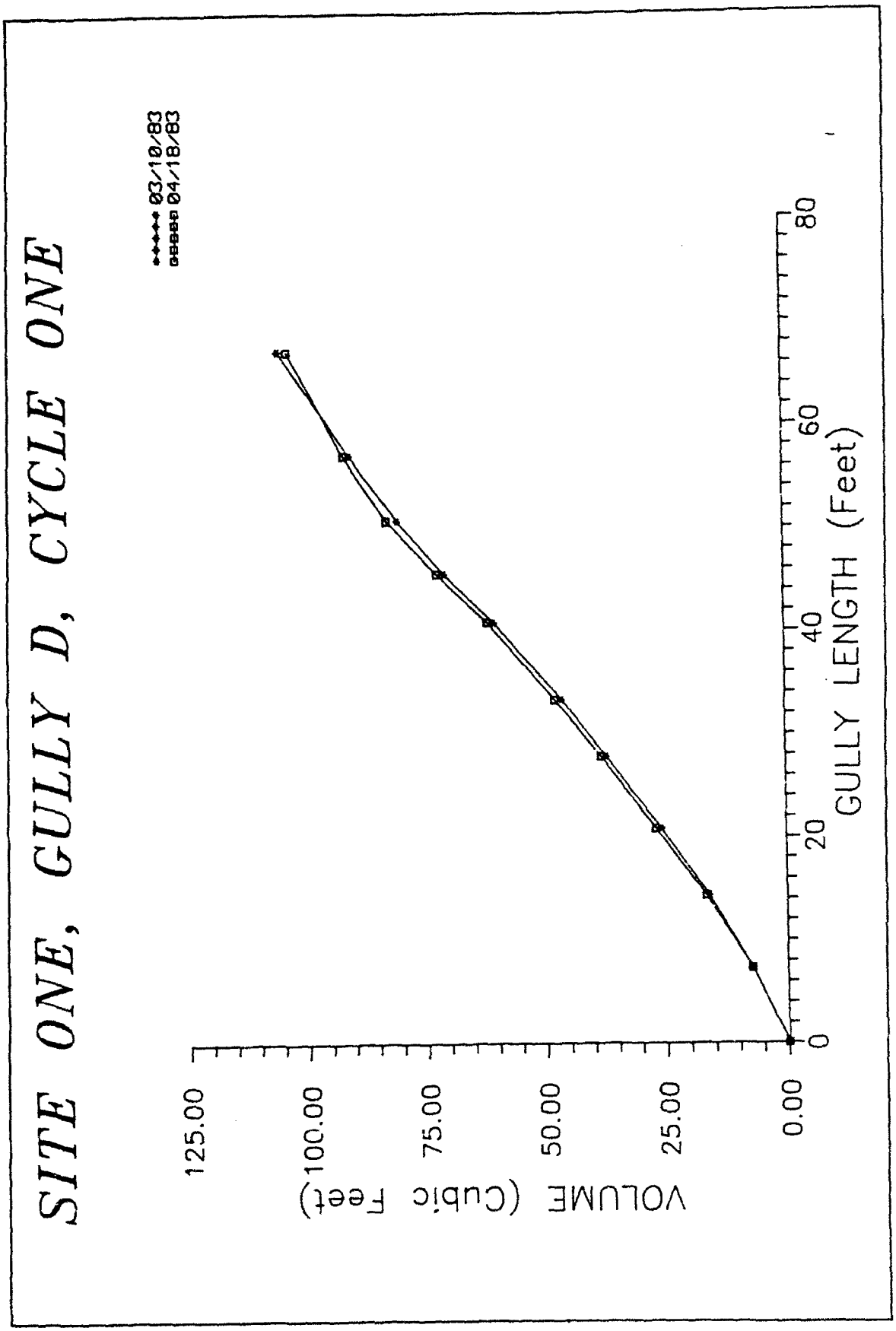
GULLY	DATE	LENGTH Feet	VOLUME Cubic Feet	SOIL WEIGHT Tons
A	02/22/85	185.80	64.57	2.90
A	03/22/85	185.80	64.81	2.91
A	04/29/85	185.80	77.90	3.50
B	02/22/85	101.80	23.69	1.06
B	03/22/85	101.80	30.77	1.38
B	04/29/85	101.80	26.64	1.19
C	02/22/85	35.00	5.93	0.26
C	03/22/85	35.00	5.11	0.22
C	04/29/85	35.00	6.60	0.29
TOTALS:		322.60	111.14	5.00

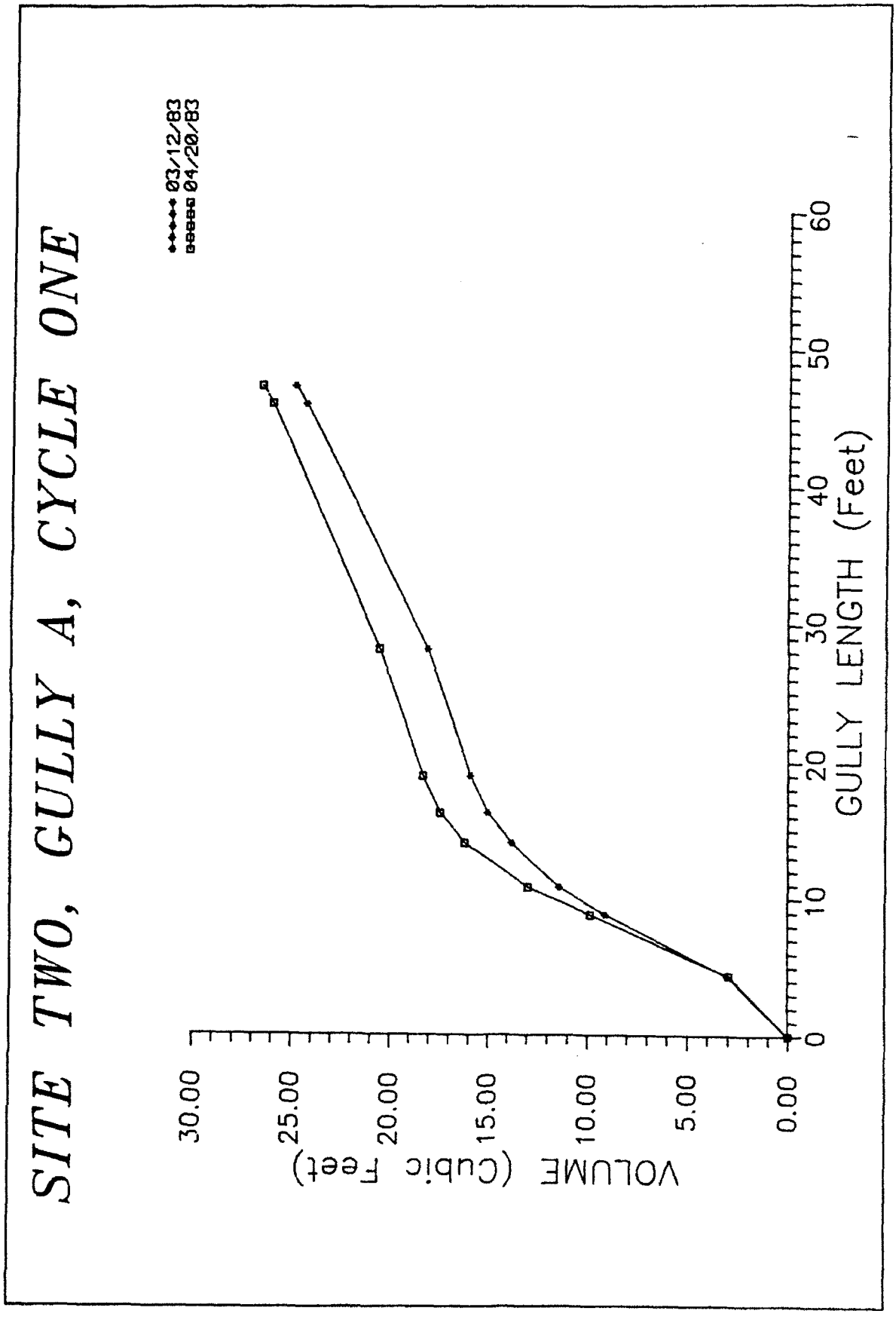
Appendix F
Volumetric Growth Ephemeral Gullies Over Time

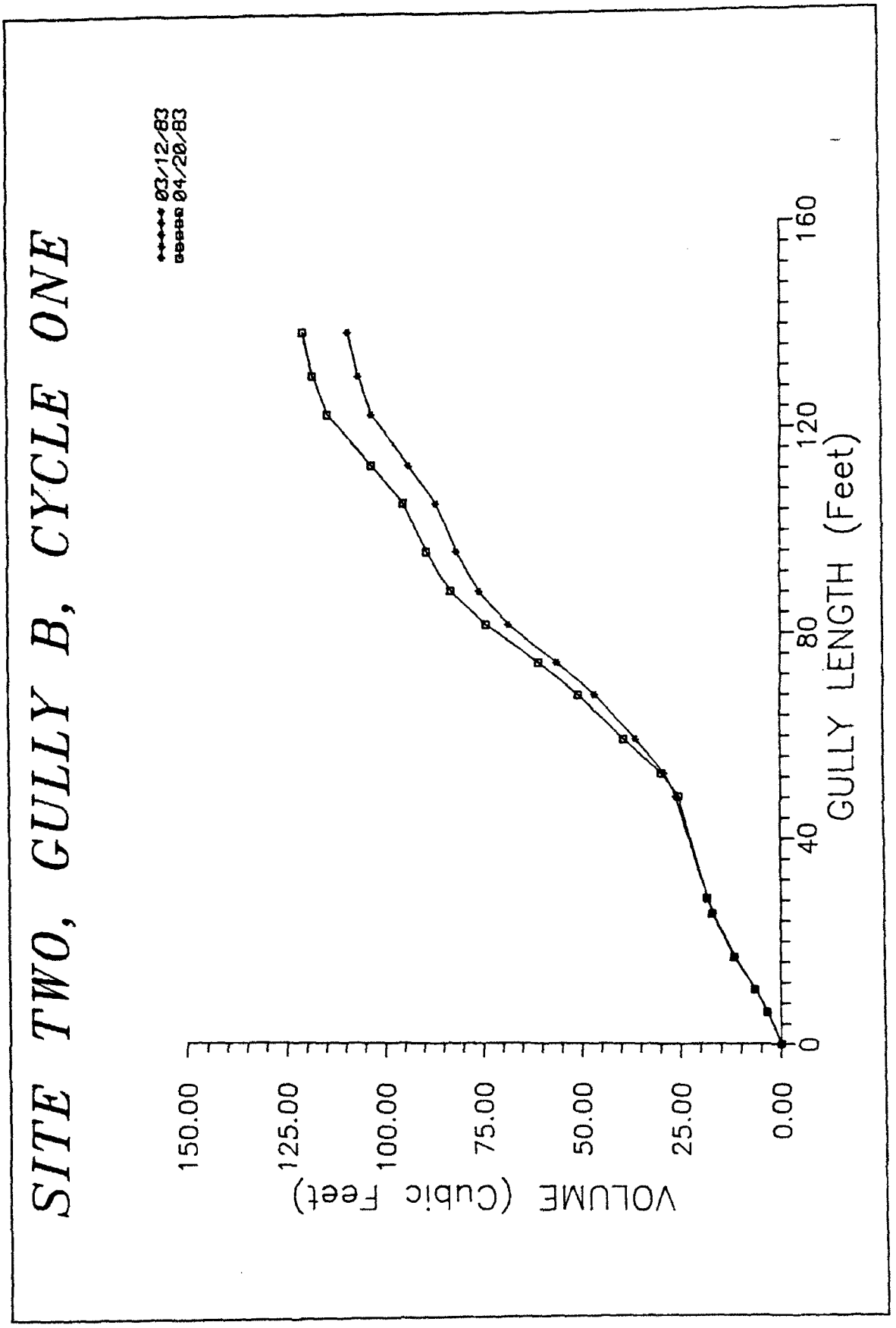

SITE ONE, GULLY A, CYCLE ONE
03/10/83
04/18/83
VOLUME (Cubic Feet)
250.00
200.00
150.00
100.00
50.00
0.00
0
50
100
150
200
GULLY LENGTH (Feet)

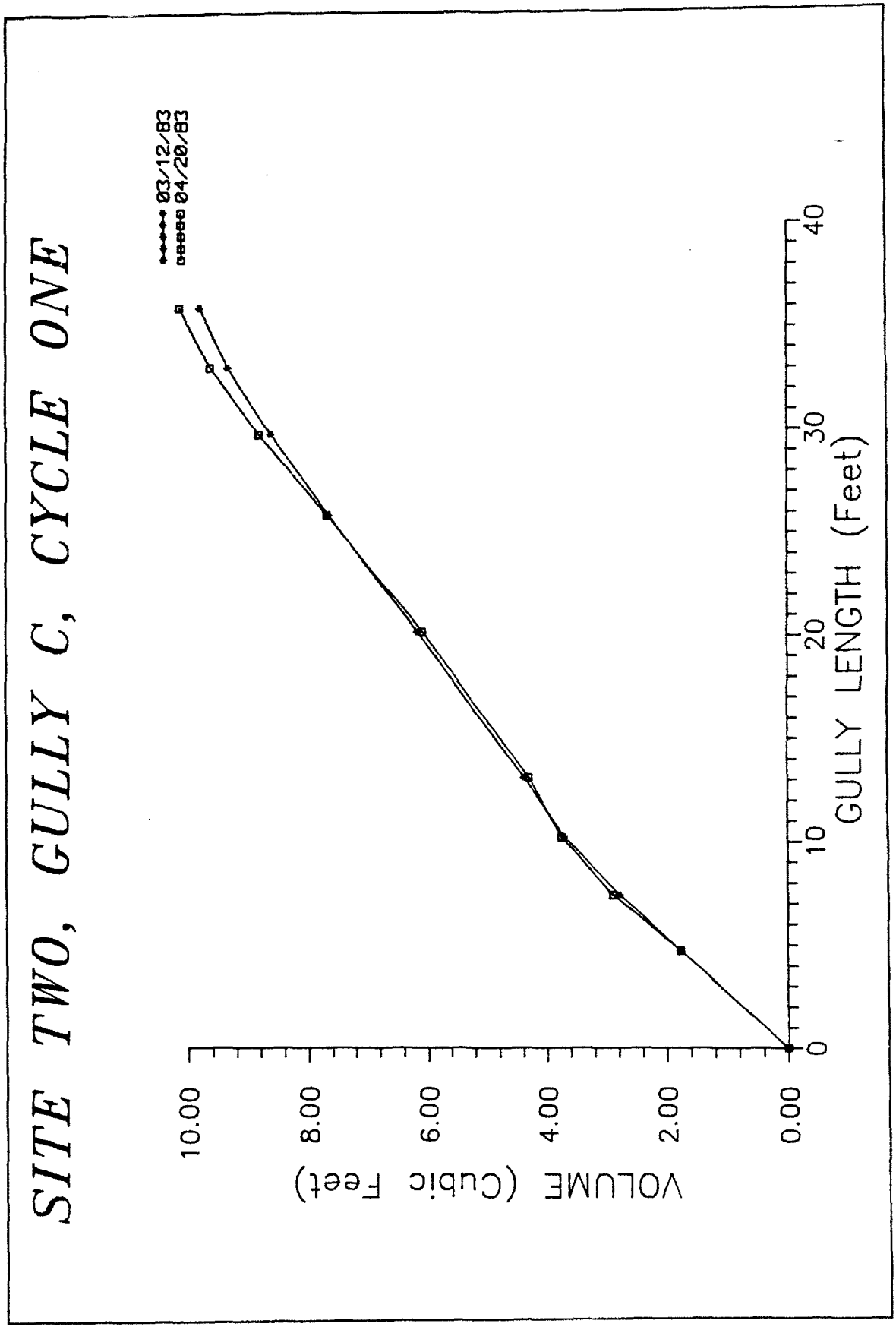

SITE ONE, GULLY B, CYCLE ONE
03/10/83
04/16/83
VOLUME (Cubic Feet)
125.00
100.00
75.00
50.00
25.00
0.00
0
20
40
60
80
100
GULLY LENGTH (Feet)

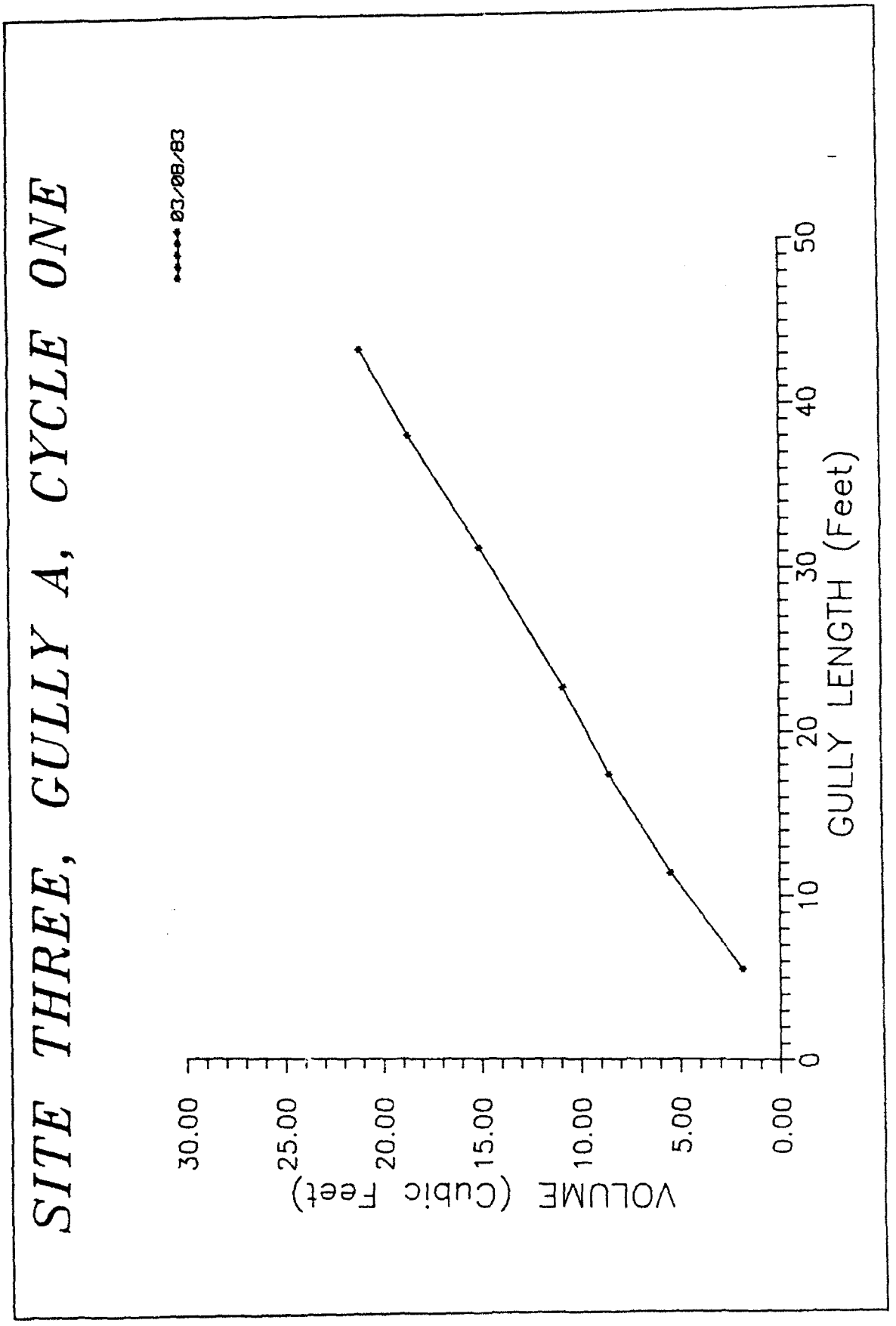

SITE ONE, GULLY C, CYCLE ONE
03/10/83
04/18/83
VOLUME (Cubic Feet)
200.00
175.00
150.00
125.00
100.00
75.00
50.00
25.00
0.00
0
40
80
120
160
GULLY LENGTH (Feet)

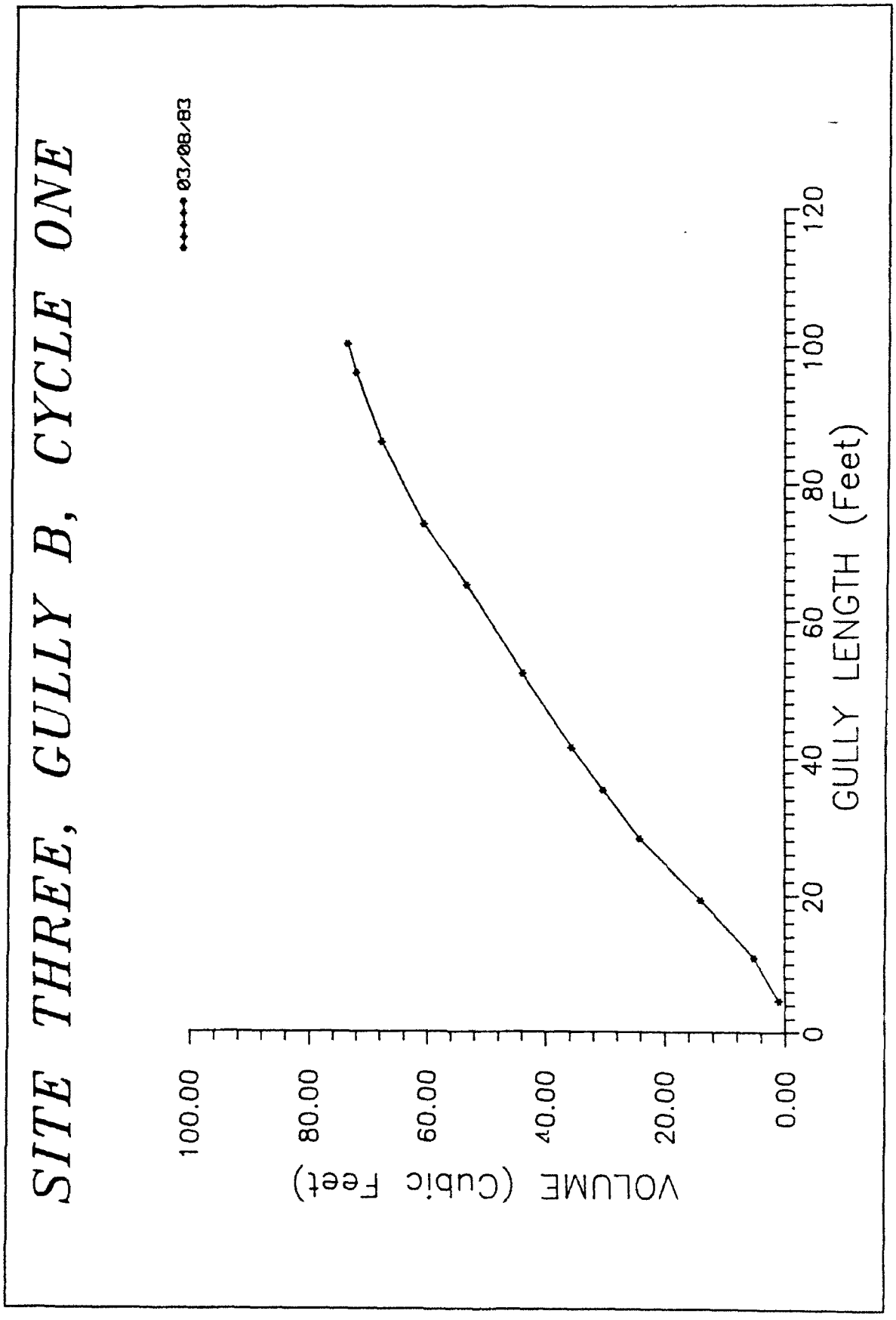

SITE ONE, GULLY D, CYCLE ONE
03/10/83
04/18/83
VOLUME (Cubic Feet)
125.00
100.00
75.00
50.00
25.00
0.00
0
20
40
60
80
GULLY LENGTH (Feet)

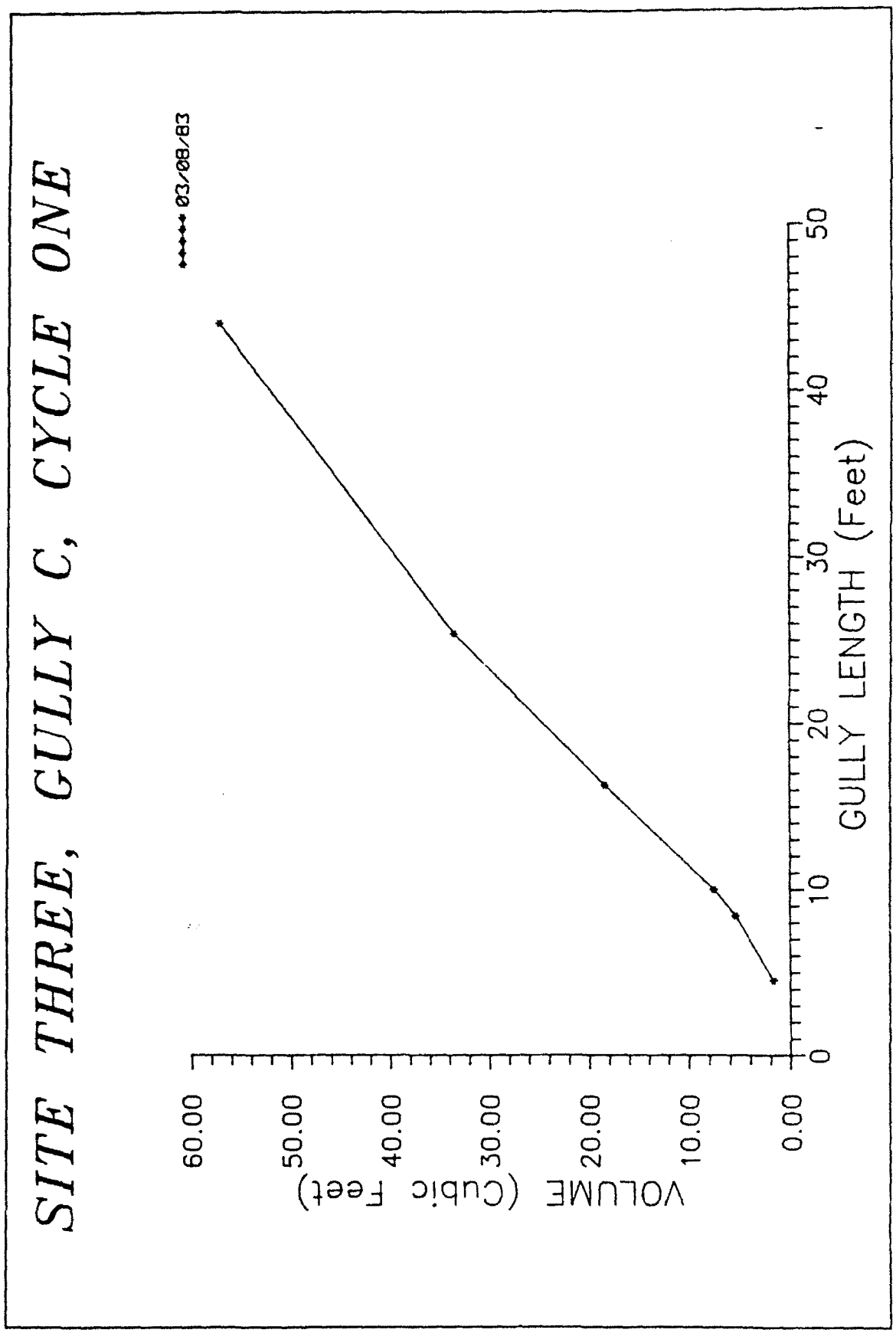

SITE TWO, GULLY A, CYCLE ONE
03/12/83
04/20/83
VOLUME (Cubic Feet)
30.00
25.00
20.00
15.00
10.00
5.00
0.00
0
10
20
30
40
50
60
GULLY LENGTH (Feet)

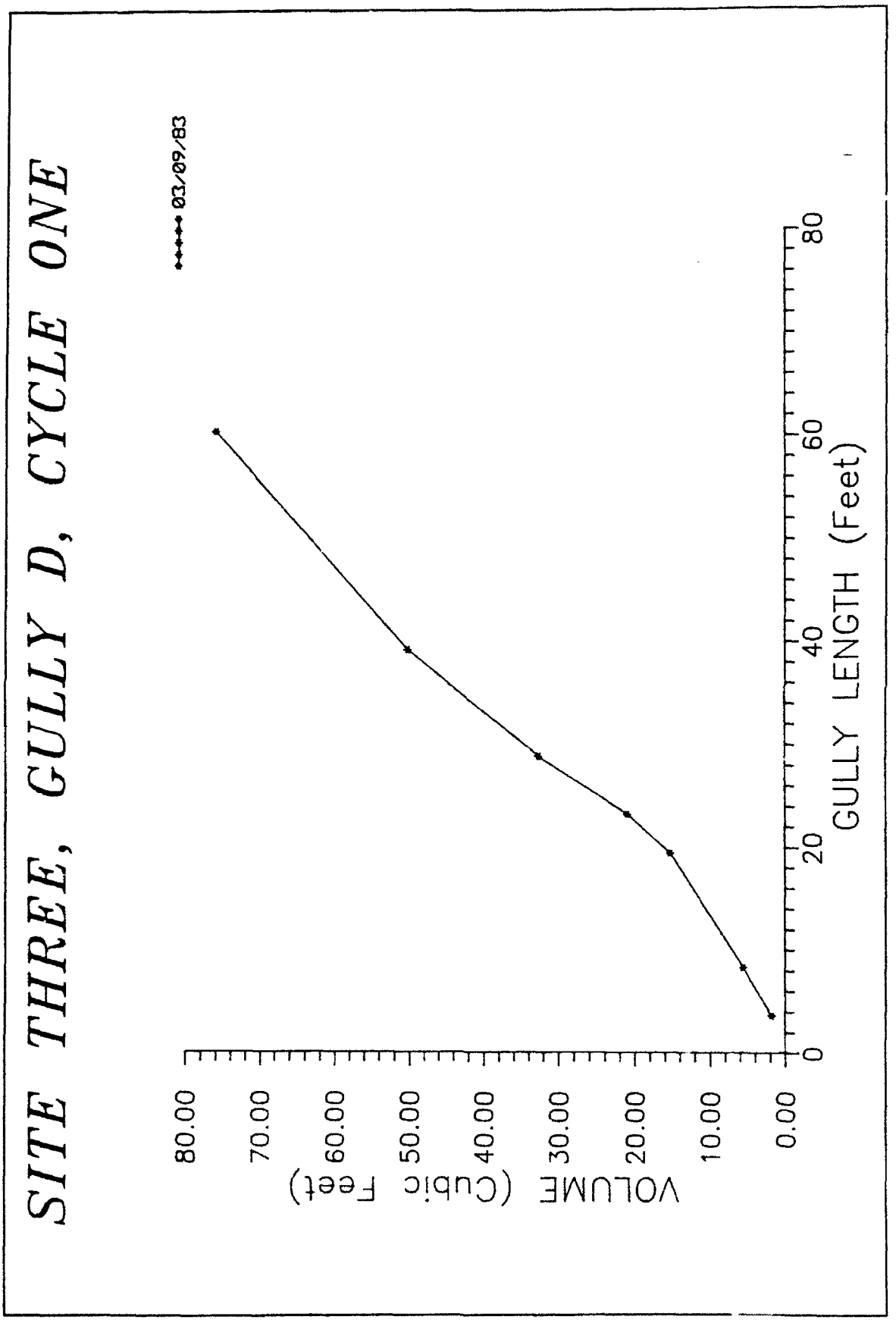

SITE TWO, GULLY B, CYCLE ONE
03/12/83
04/20/83
VOLUME (Cubic Feet)
150.00
125.00
100.00
75.00
50.00
25.00
0.00
0
40
80
120
160
GULLY LENGTH (Feet)

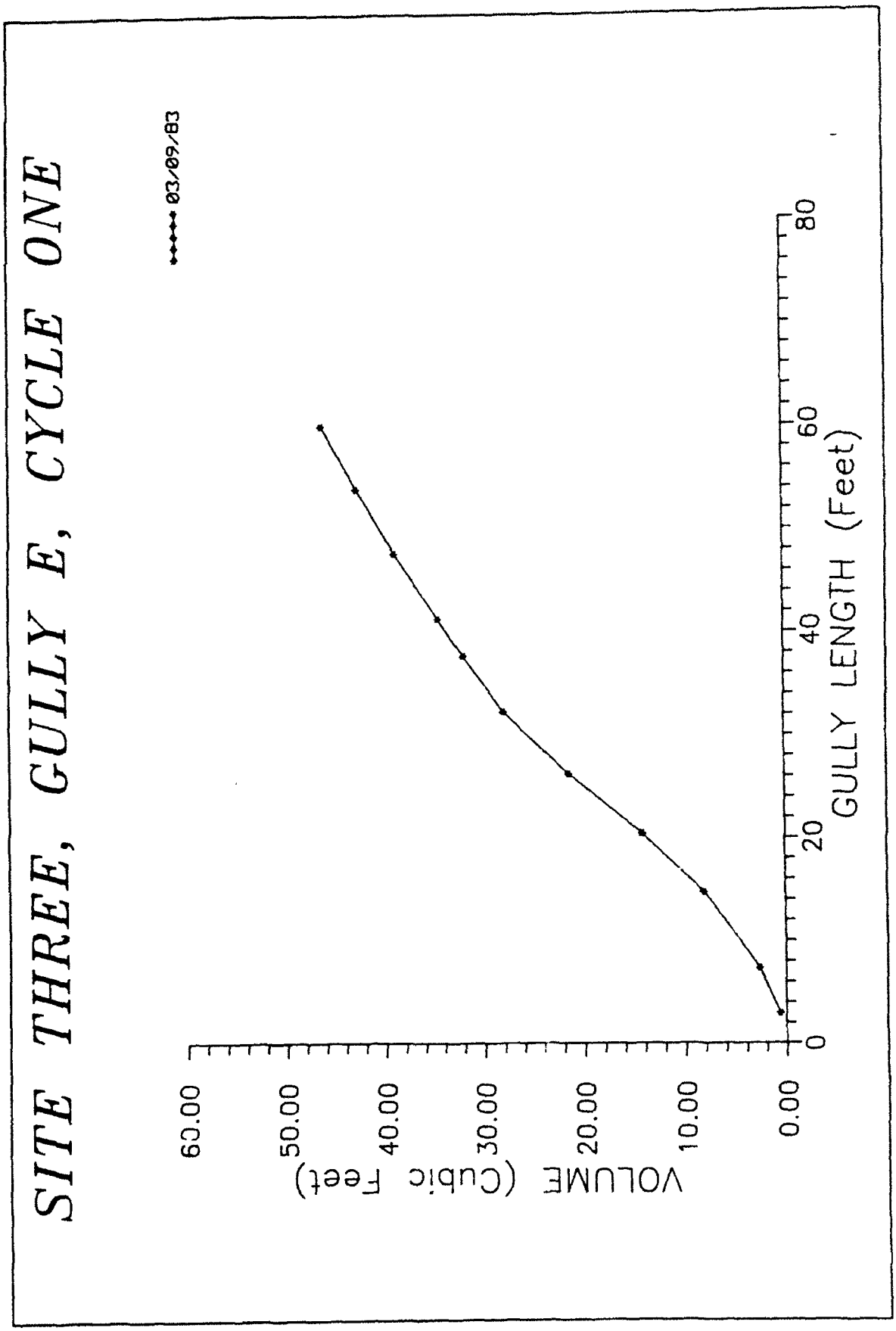

SITE TWO, GULLY C, CYCLE ONE
03/12/83
04/20/83
VOLUME (Cubic Feet)
10.00
8.00
6.00
4.00
2.00
0.00
0
10
20
30
40
GULLY LENGTH (Feet)

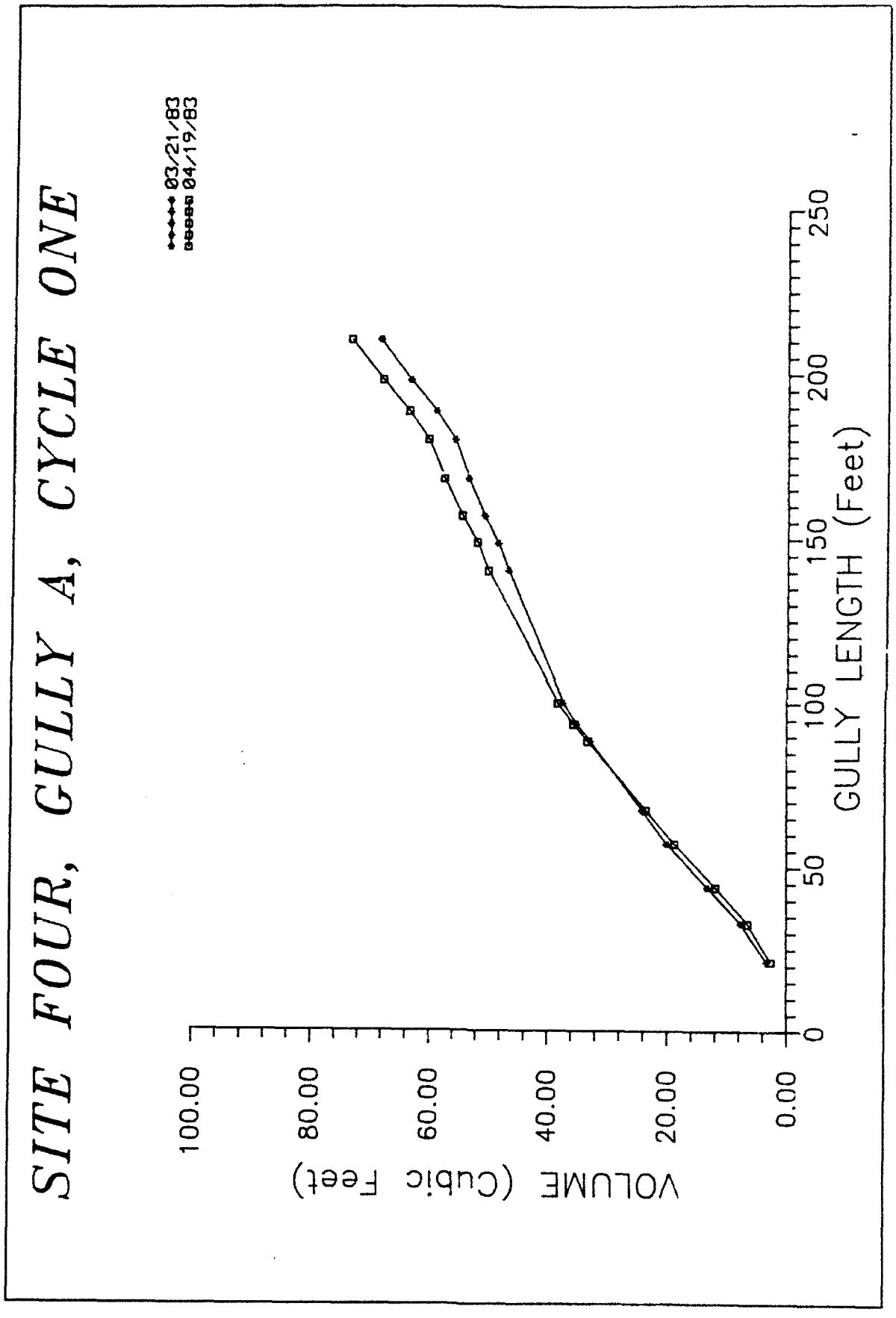

SITE THREE, GULLY A, CYCLE ONE
03/08/83
VOLUME (Cubic Feet)
30.00
25.00
20.00
15.00
10.00
5.00
0.00
0
10
20
30
40
50
GULLY LENGTH (Feet)

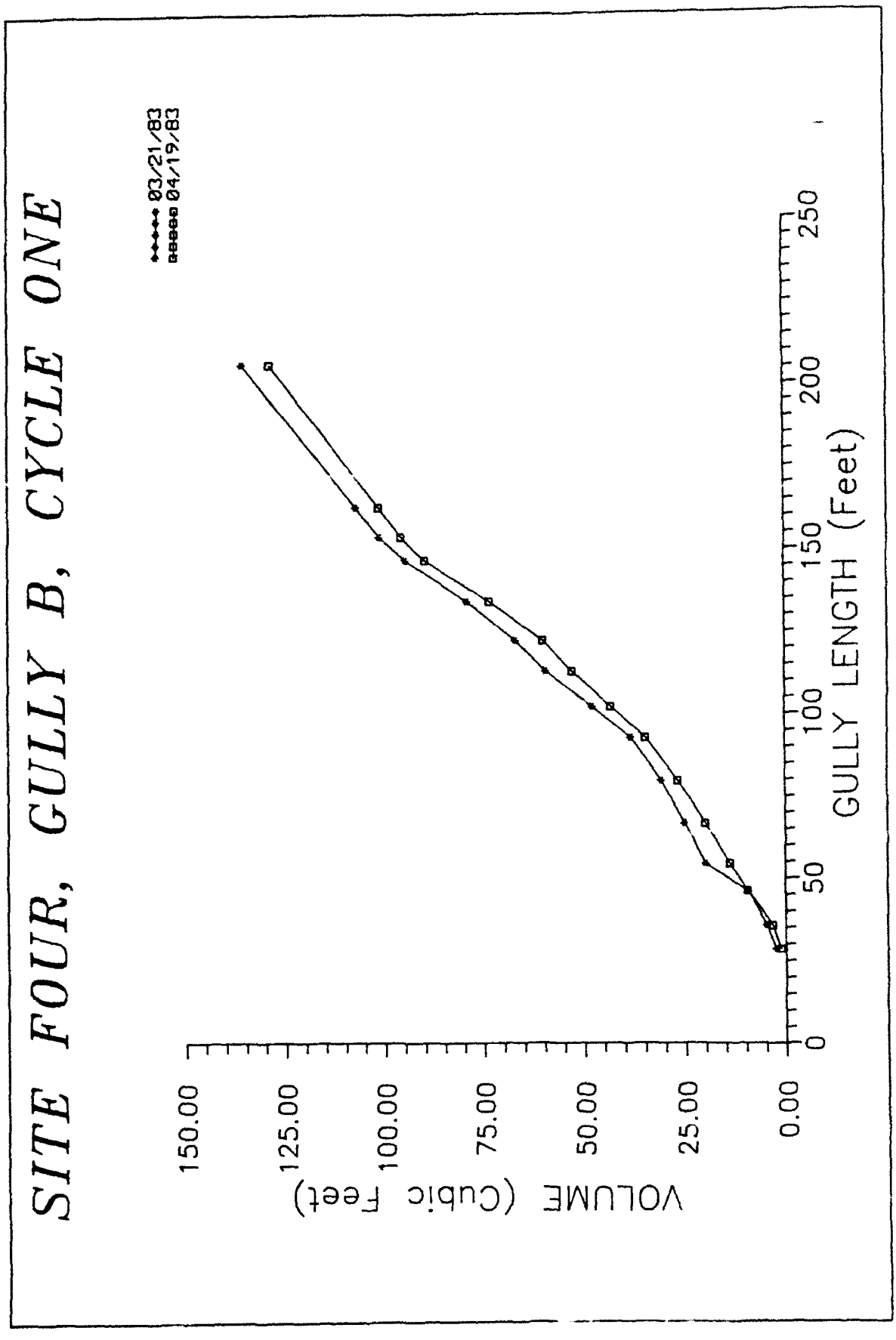

SITE THREE, GULLY B, CYCLE ONE
03/08/83
VOLUME (Cubic Feet)
100.00
80.00
60.00
40.00
20.00
0.00
0
20
40
60
80
100
120
GULLY LENGTH (Feet)

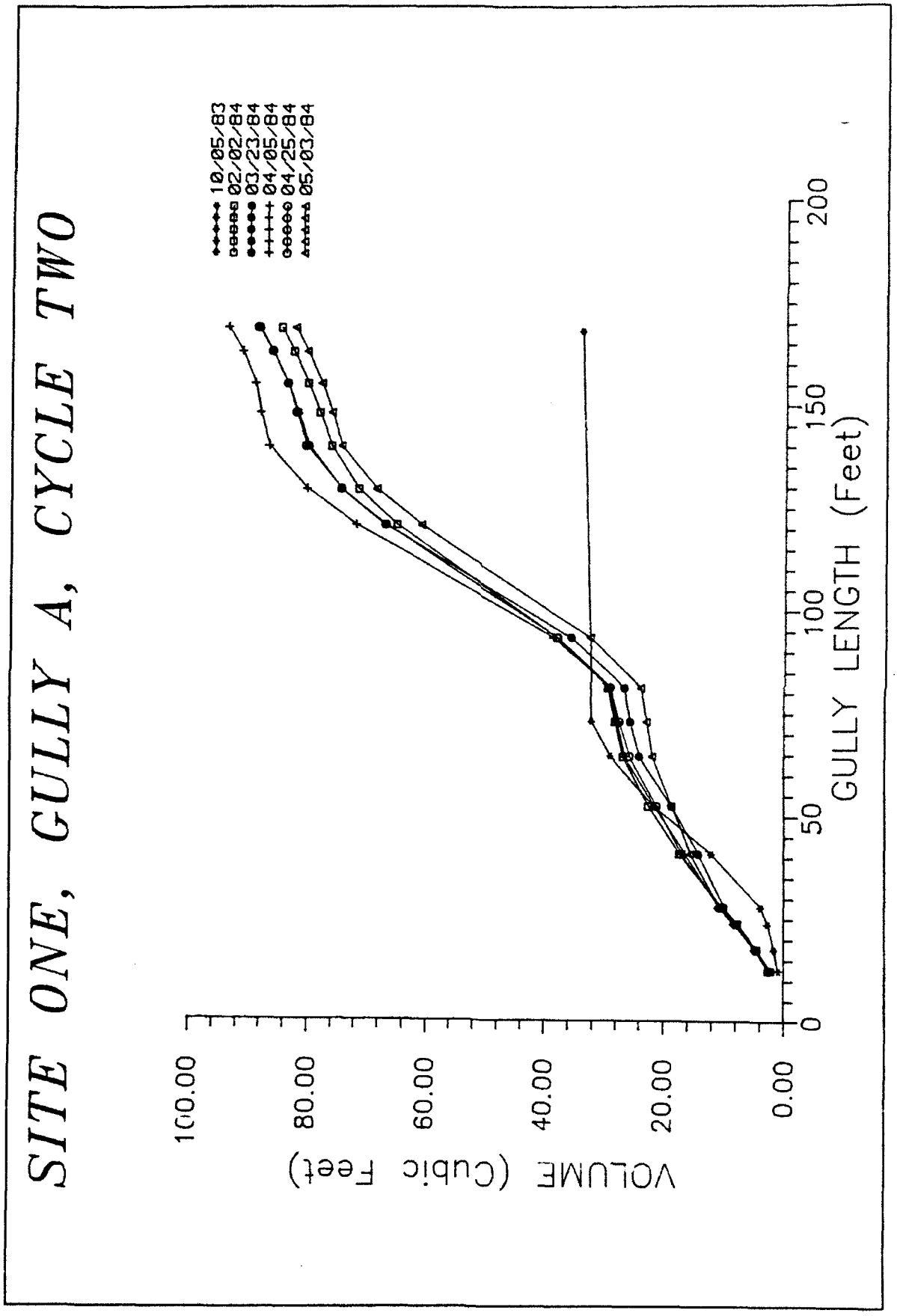

SITE THREE, GULLY C, CYCLE ONE
03/08/83
VOLUME (Cubic Feet)
0.00
10.00
20.00
30.00
40.00
50.00
60.00
0
10
20
30
40
50
GULLY LENGTH (Feet)

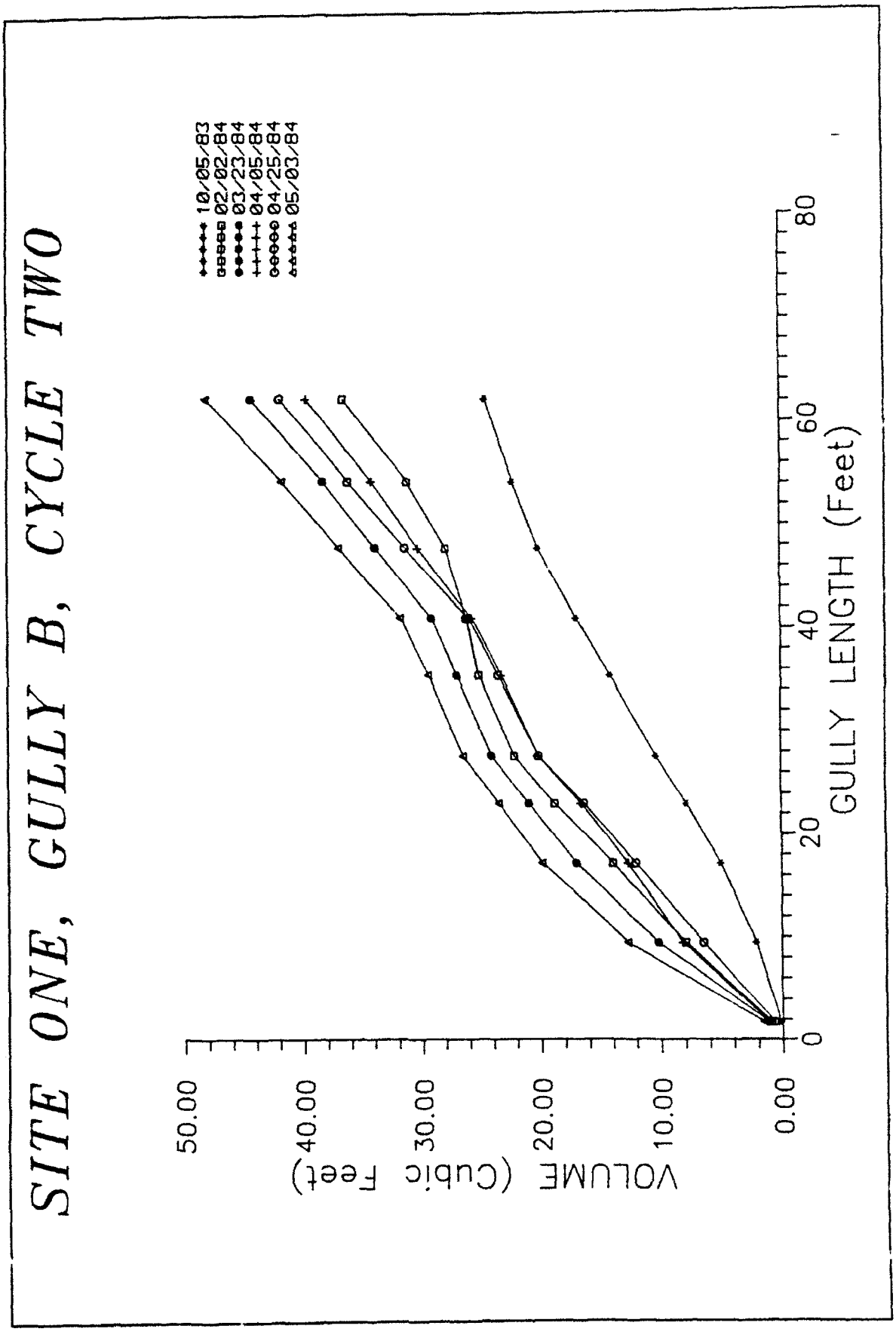

SITE THREE, GULLY D, CYCLE ONE
03/09/83
VOLUME (Cubic Feet)
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
0
20
40
60
80
GULLY LENGTH (Feet)

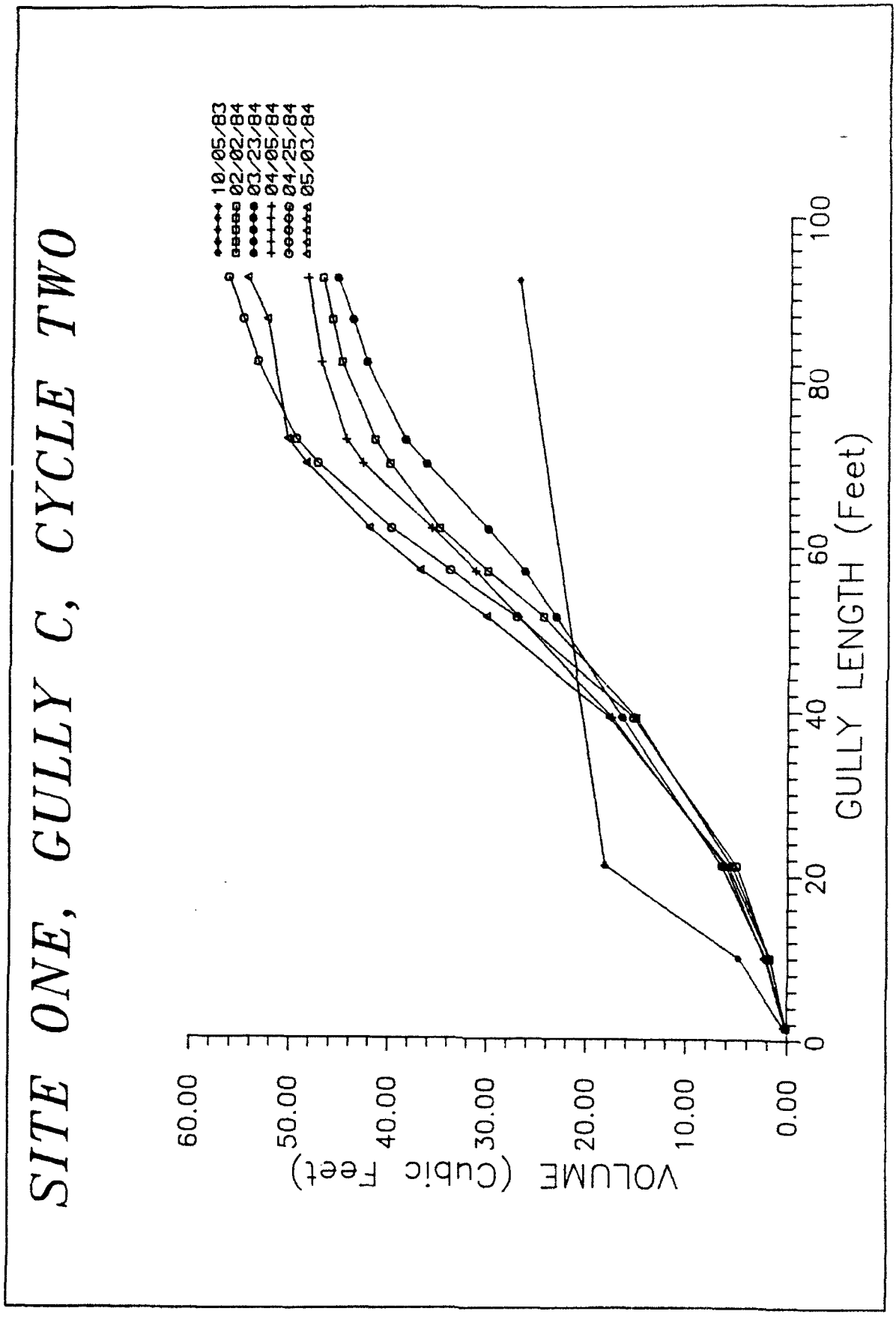

SITE THREE, GULLY E, CYCLE ONE
03/09/83
VOLUME (Cubic Feet)
60.00
50.00
40.00
30.00
20.00
10.00
0.00
0
20
40
60
80
GULLY LENGTH (Feet)

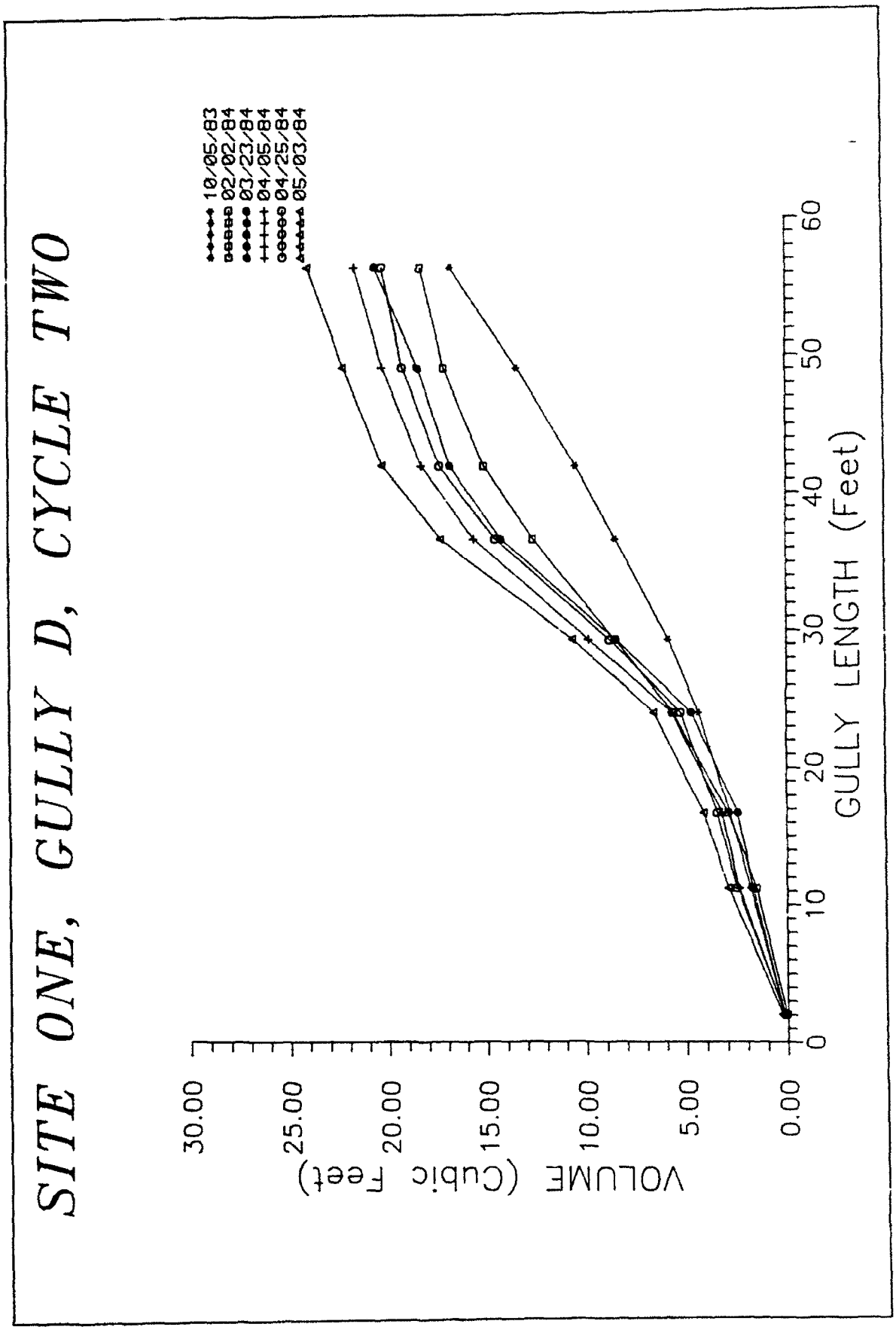

SITE FOUR, GULLY A, CYCLE ONE
03/21/83
04/19/83
VOLUME (Cubic Feet)
100.00
80.00
60.00
40.00
20.00
0.00
0
50
100
150
200
250
GULLY LENGTH (Feet)

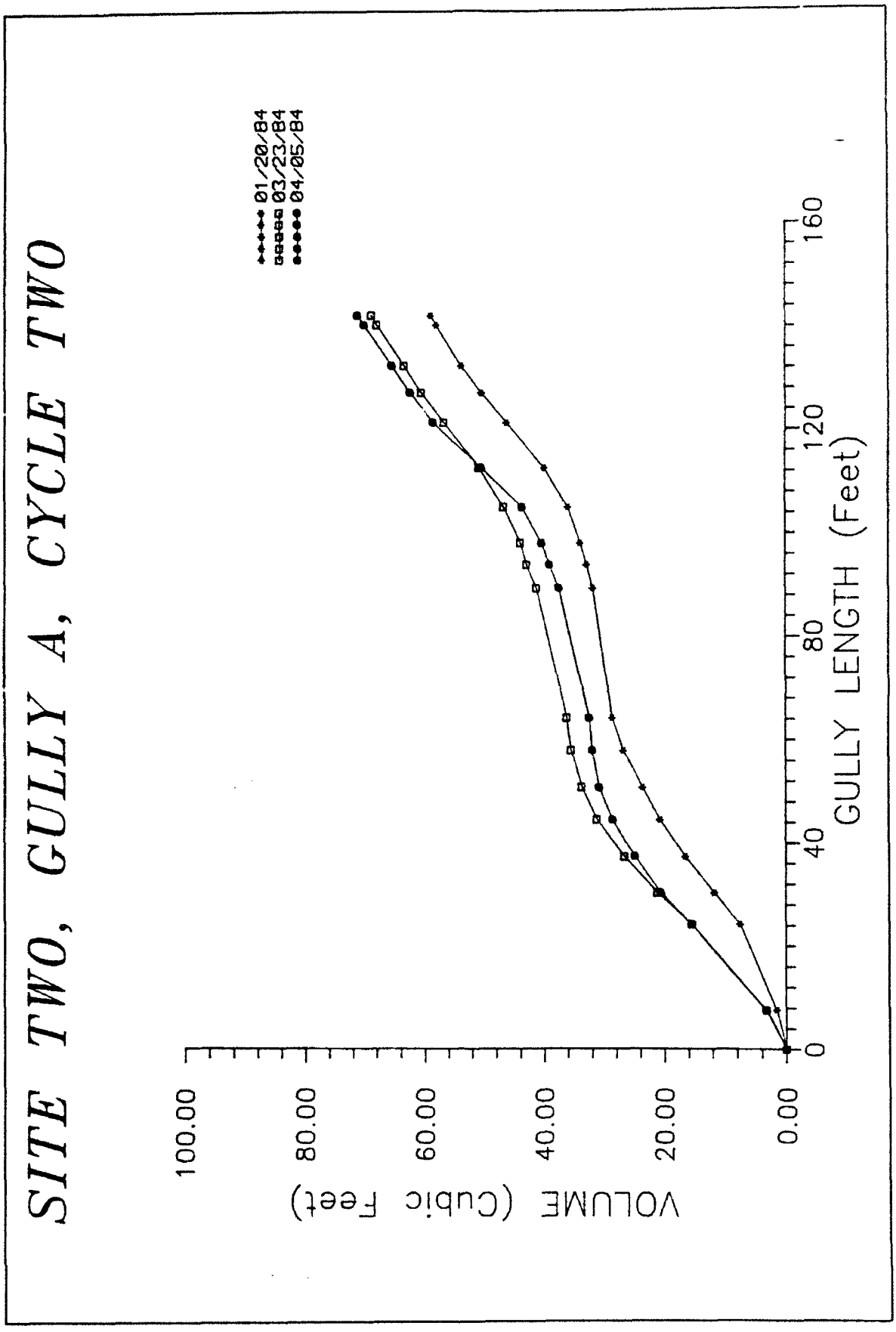

SITE FOUR, GULLY B, CYCLE ONE
03/21/83
04/19/83
VOLUME (Cubic Feet)
150.00
125.00
100.00
75.00
50.00
25.00
0.00
0
50
100
150
200
250
GULLY LENGTH (Feet)

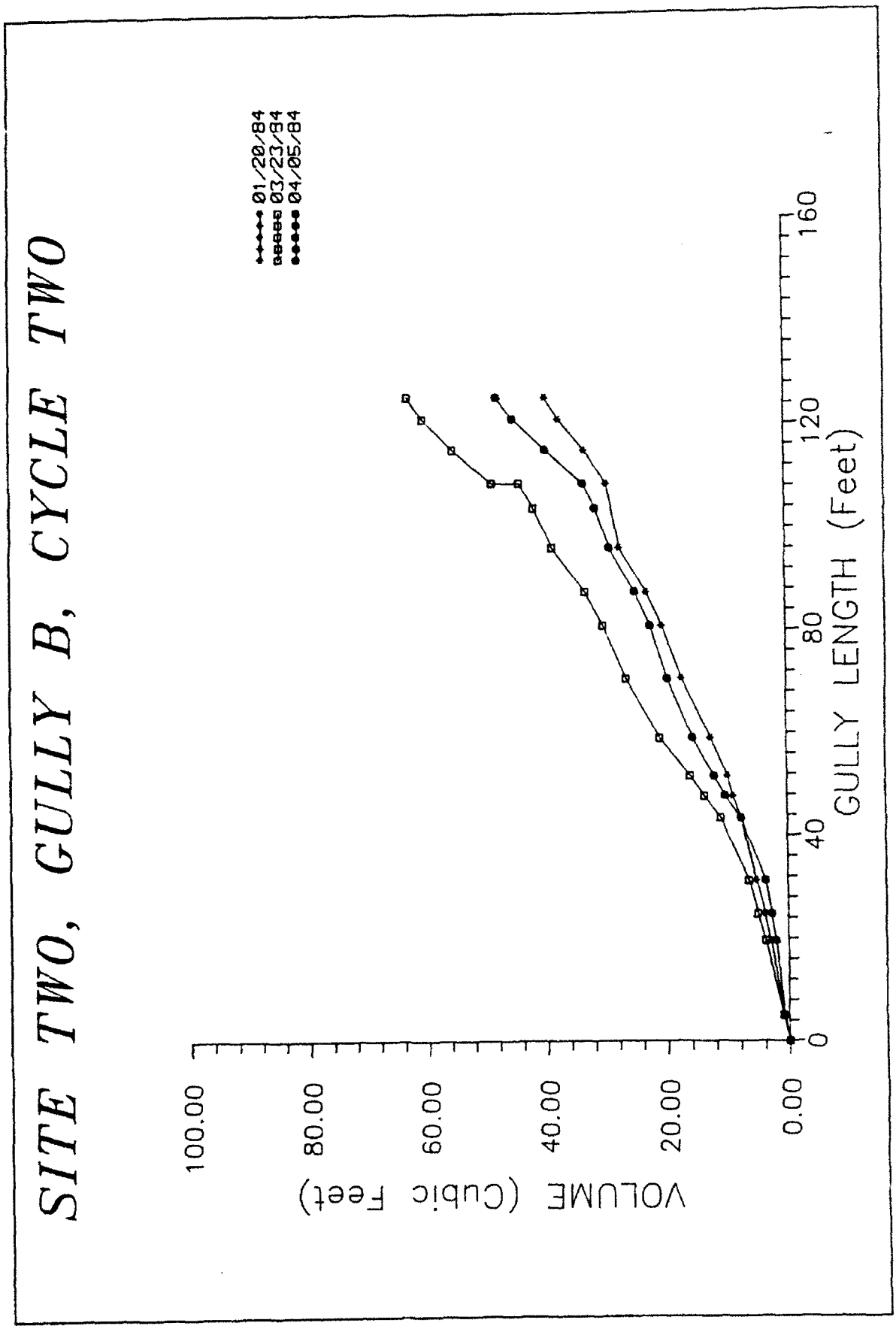

SITE ONE, GULLY A, CYCLE TWO
10/05/83
02/02/84
03/23/84
04/05/84
04/25/84
05/03/84
VOLUME (Cubic Feet)
100.00
80.00
60.00
40.00
20.00
0.00
0
50
100
150
200
GULLY LENGTH (Feet)

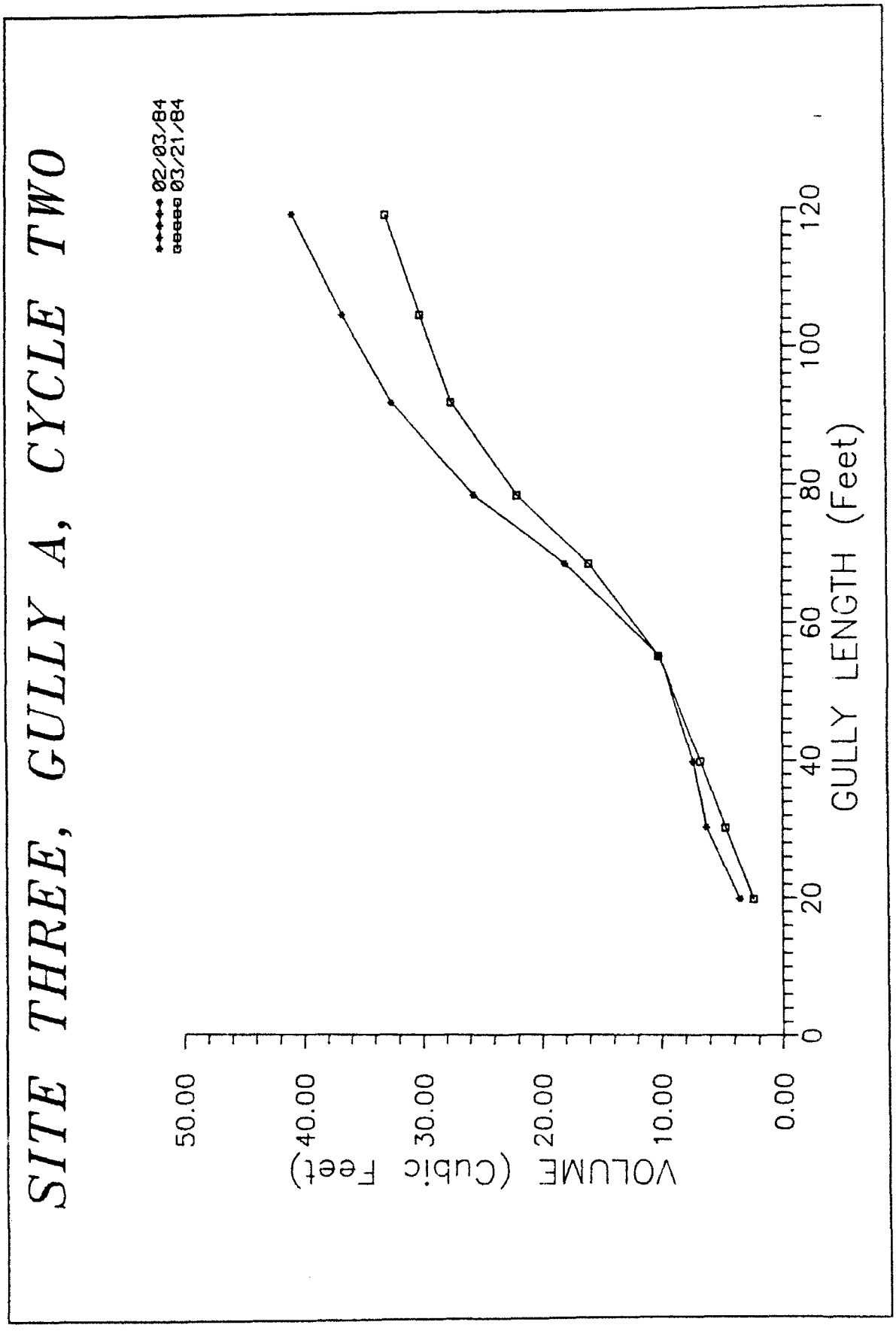

SITE ONE, GULLY B, CYCLE TWO
10/05/83
02/02/84
03/23/84
04/05/84
04/25/84
05/03/84
VOLUME (Cubic Feet)
50.00
40.00
30.00
20.00
10.00
0.00
0
20
40
60
80
GULLY LENGTH (Feet)

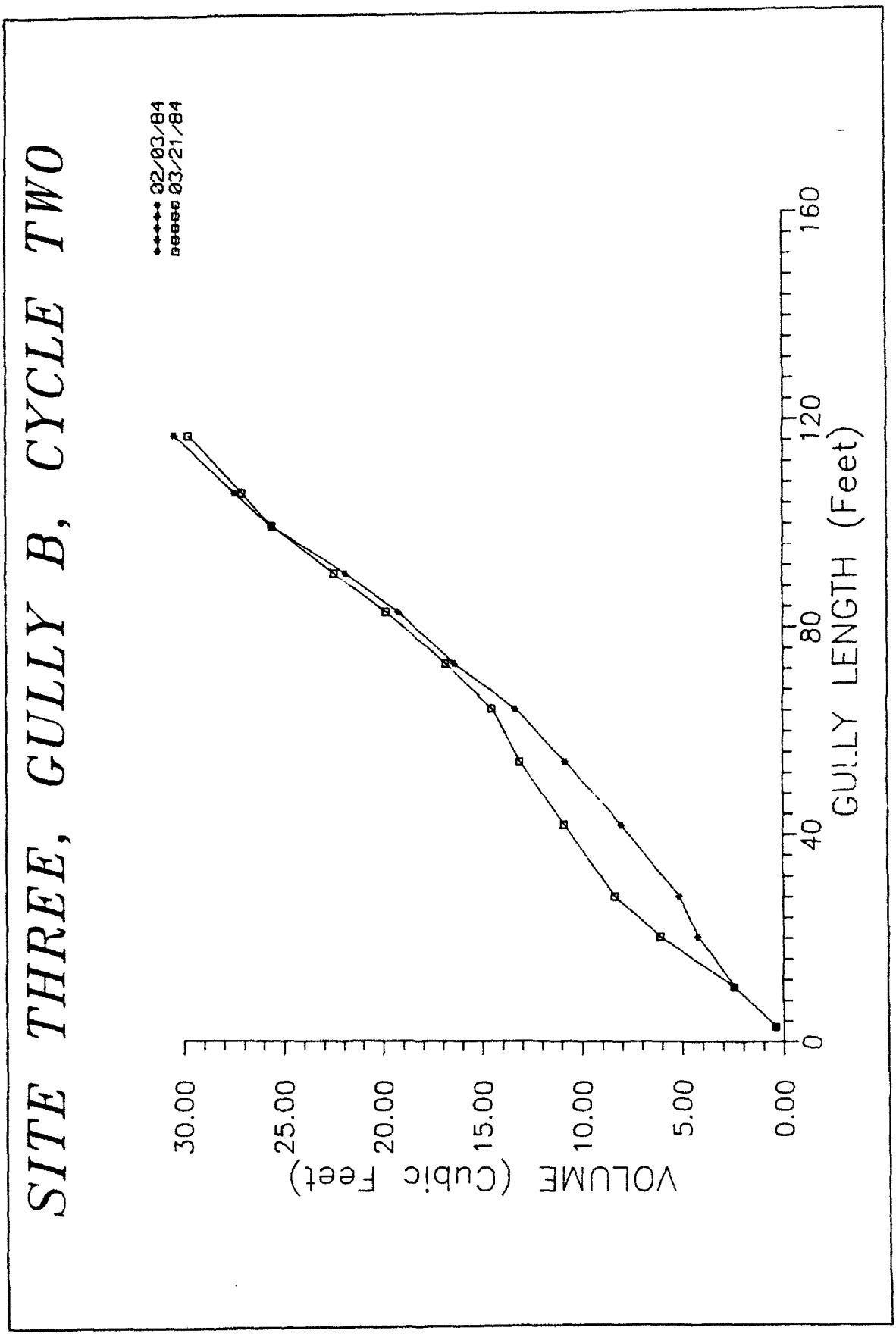

SITE ONE, GULLY C, CYCLE TWO
10/05/83
02/02/84
03/23/84
04/05/84
04/25/84
05/03/84
VOLUME (Cubic Feet)
60.00
50.00
40.00
30.00
20.00
10.00
0.00
0
20
40
60
80
100
GULLY LENGTH (Feet)

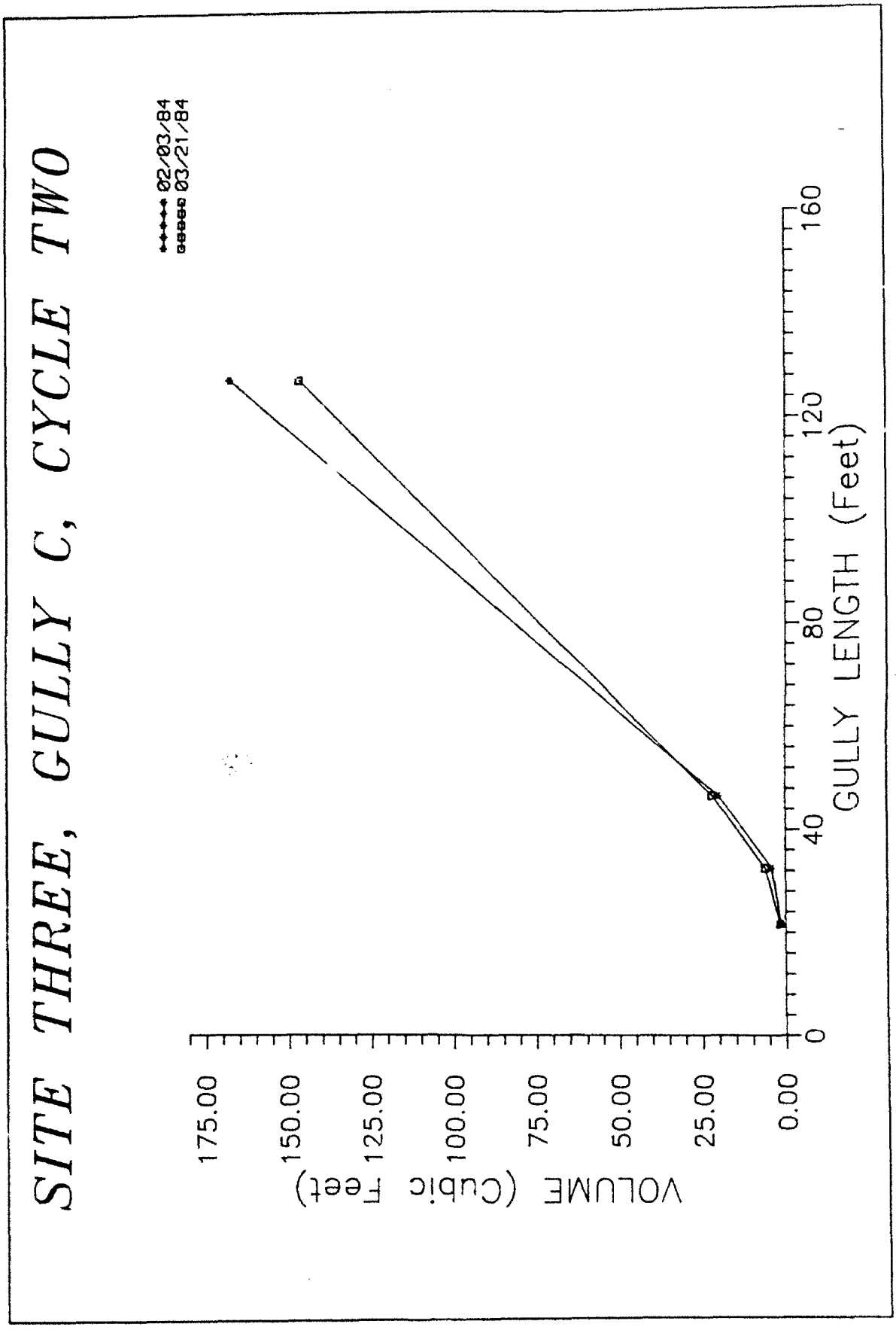

SITE ONE, GULLY D, CYCLE TWO
10/05/83
02/02/84
03/23/84
04/05/84
04/25/84
05/03/84
VOLUME (Cubic Feet)
30.00
25.00
20.00
15.00
10.00
5.00
0.00
0
10
20
30
40
50
60
GULLY LENGTH (Feet)


SITE TWO, GULLY A, CYCLE TWO
01/20/84
03/23/84
04/05/84
VOLUME (Cubic Feet)
100.00
80.00
60.00
40.00
20.00
0.00
0
40
80
120
160
GULLY LENGTH (Feet)


SITE TWO, GULLY B, CYCLE TWO
01/20/84
03/23/84
04/05/84
VOLUME (Cubic Feet)
100.00
80.00
60.00
40.00
20.00
0.00
0
40
80
120
160
GULLY LENGTH (Feet)


SITE THREE, GULLY A, CYCLE TWO
02/03/84
03/21/84
VOLUME (Cubic Feet)
50.00
40.00
30.00
20.00
10.00
0.00
0
20
40
60
80
100
120
GULLY LENGTH (Feet)


SITE THREE, GULLY B, CYCLE TWO
02/03/84
03/21/84
VOLUME (Cubic Feet)
30.00
25.00
20.00
15.00
10.00
5.00
0.00
0
40
80
120
160
GULLY LENGTH (Feet)


SITE THREE, GULLY C, CYCLE TWO
02/03/84
03/21/84
VOLUME (Cubic Feet)
175.00
150.00
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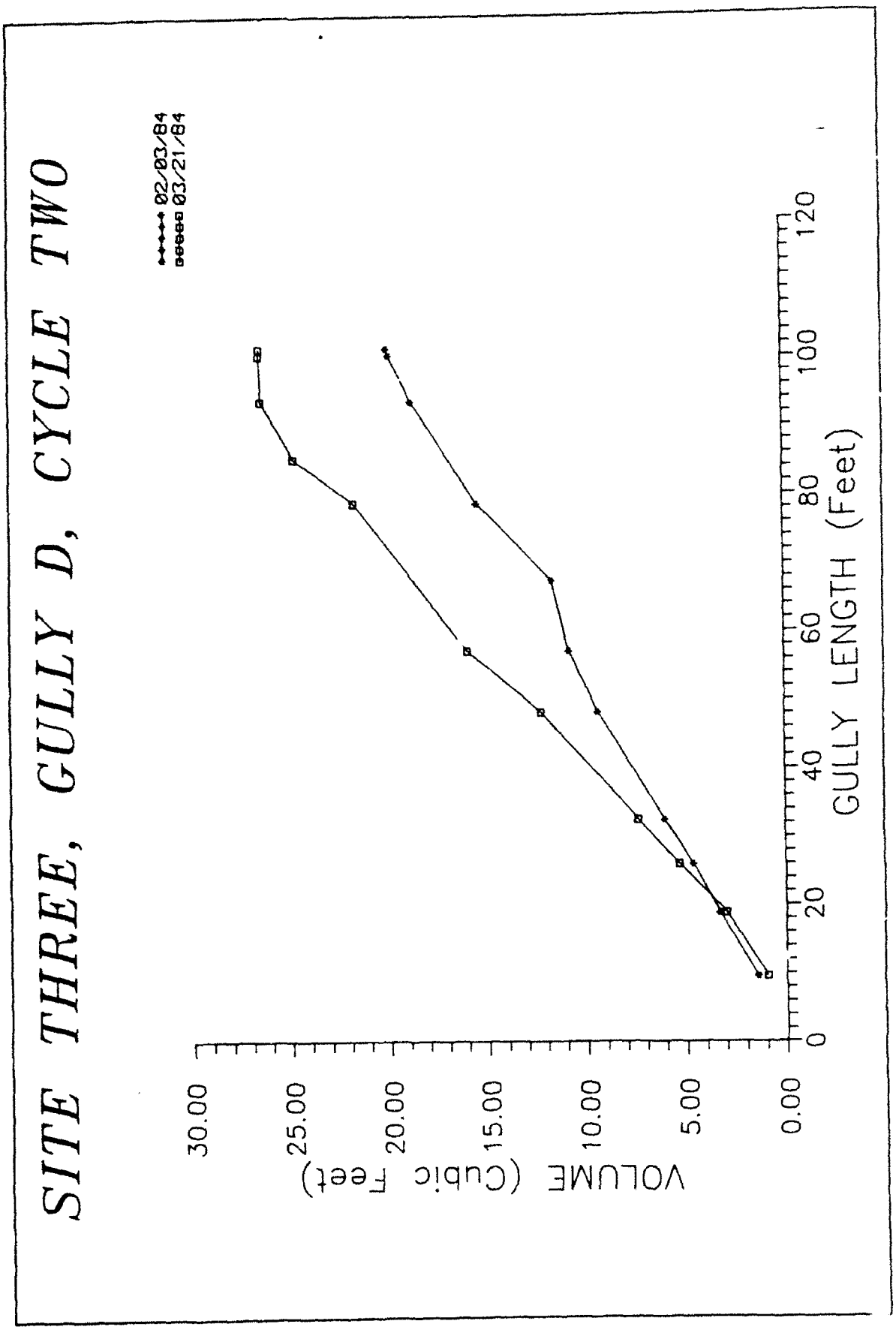
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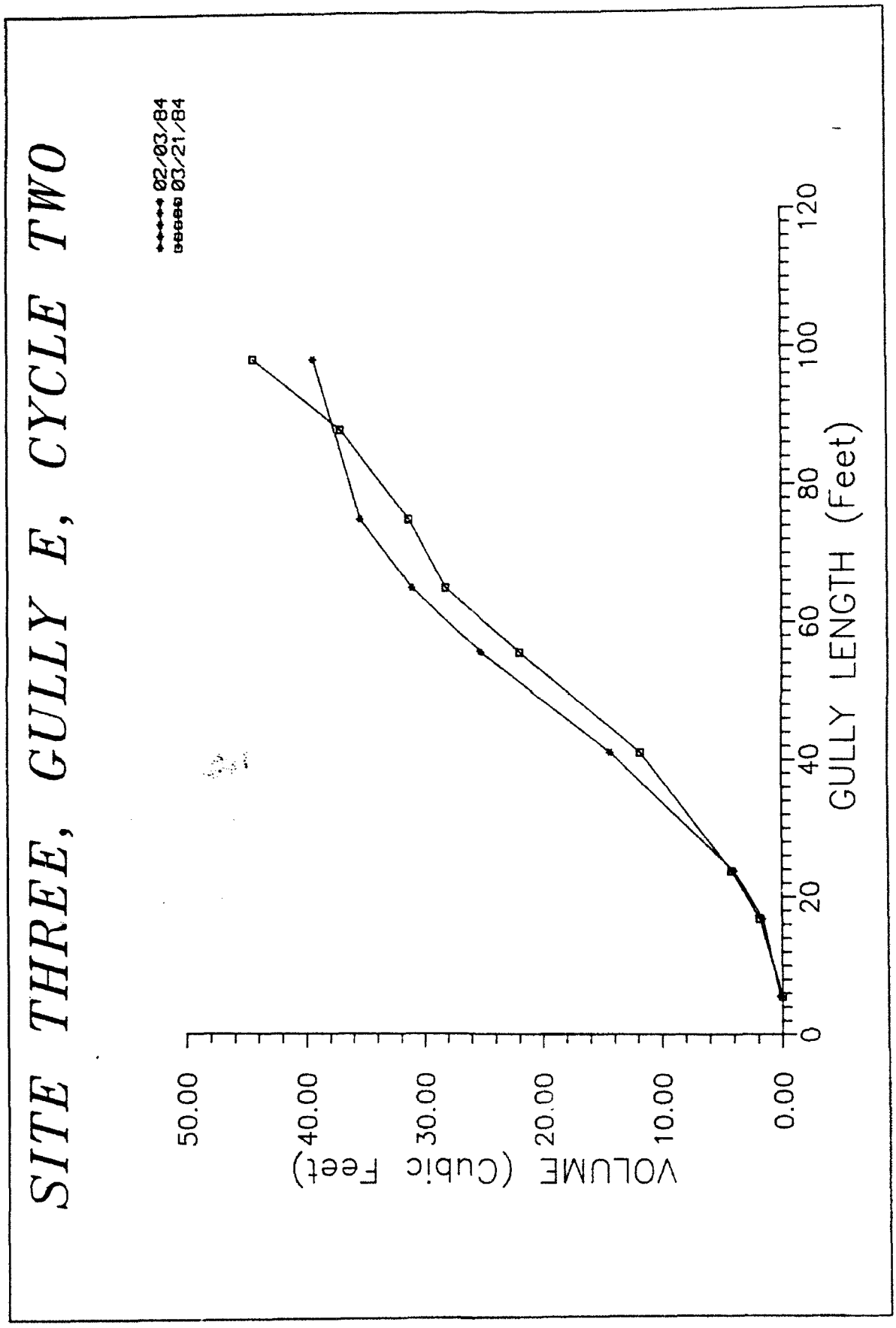
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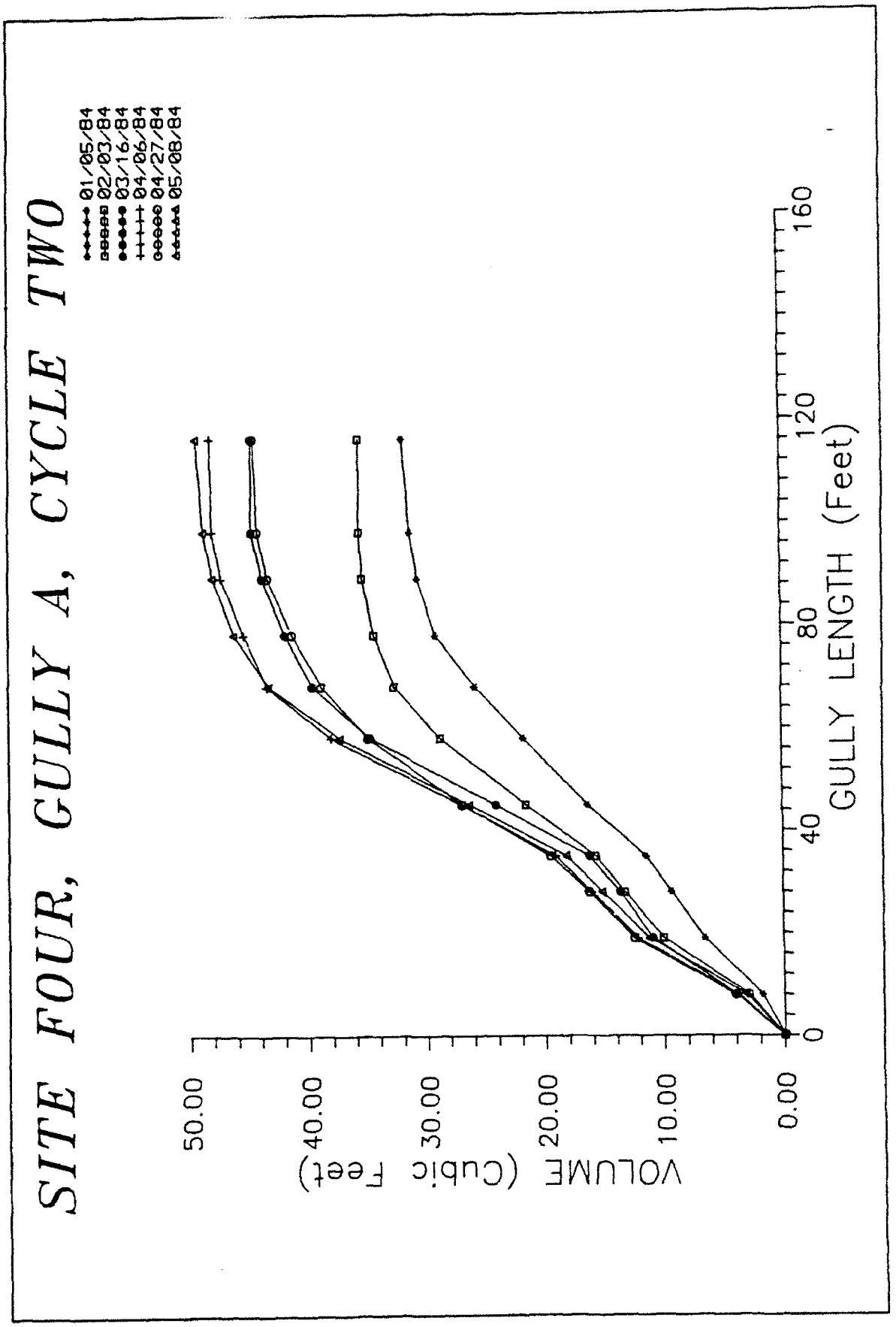
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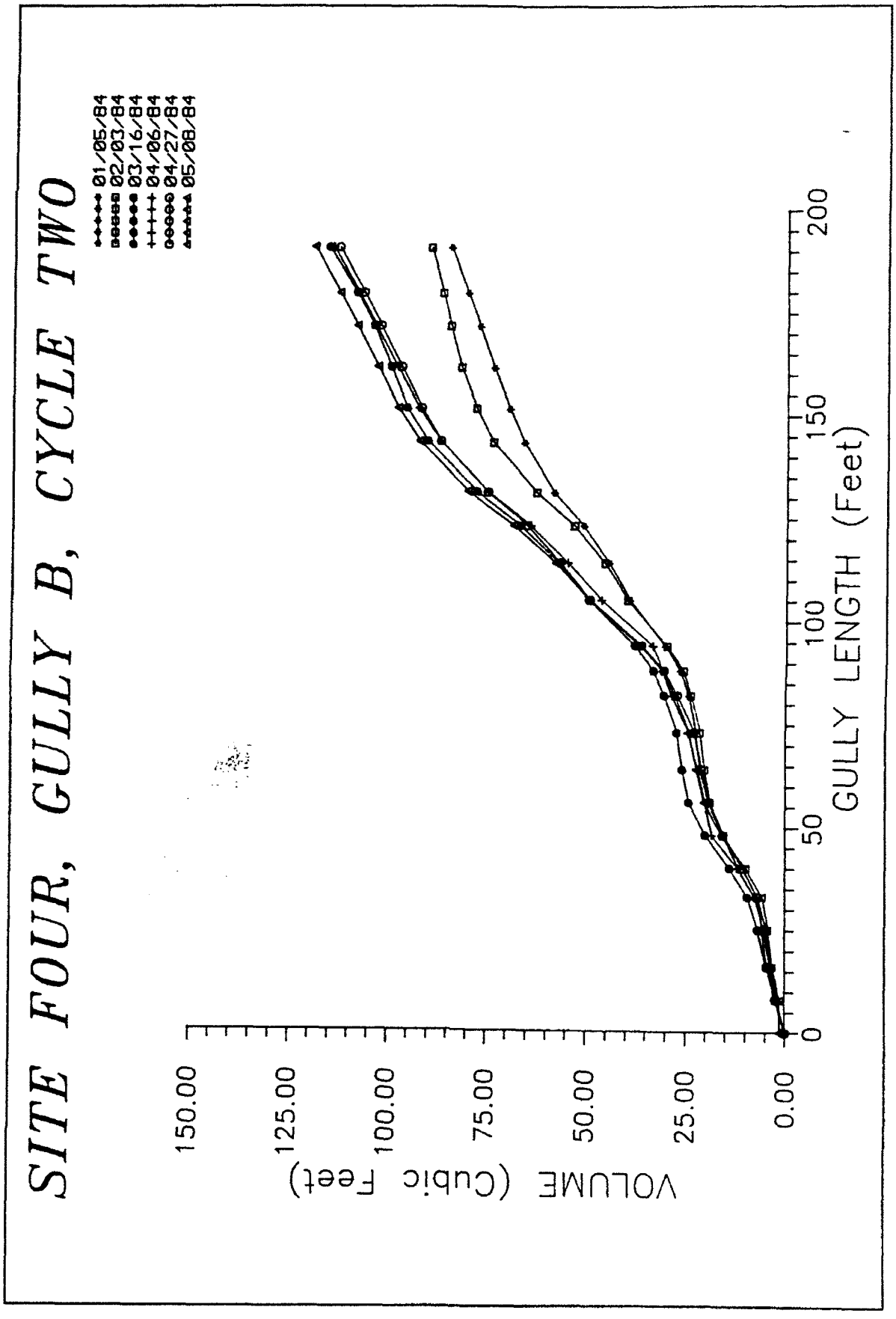
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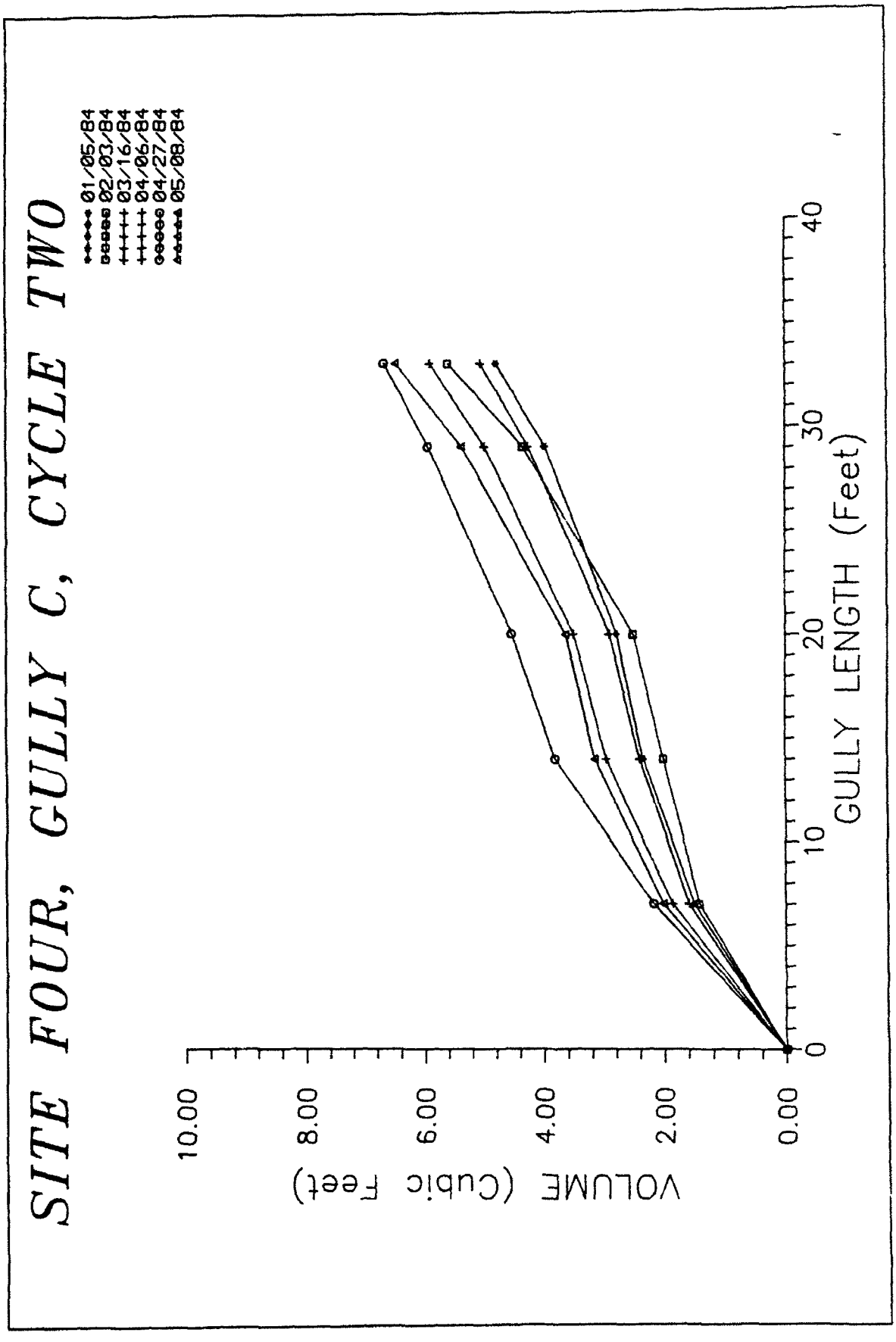
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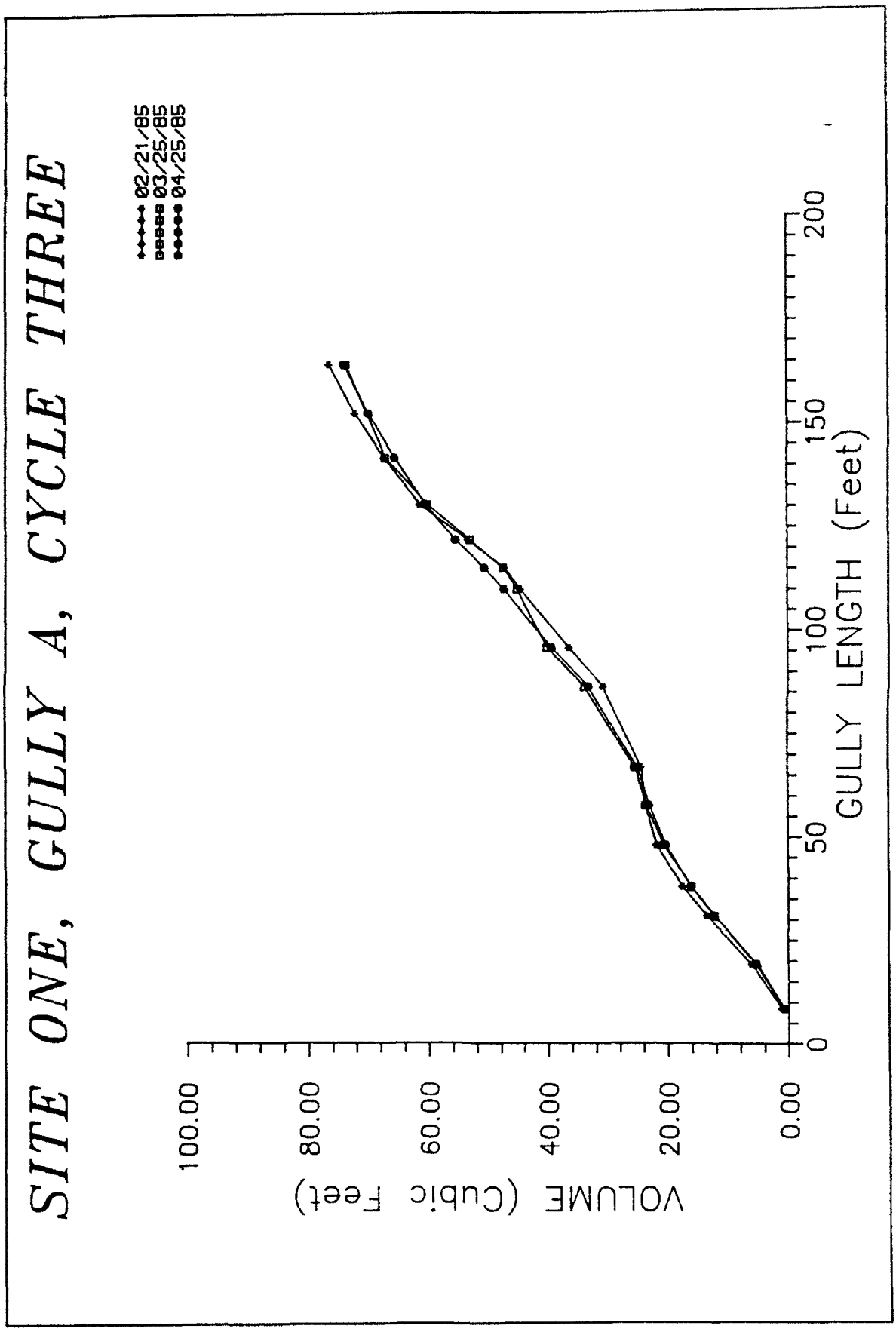
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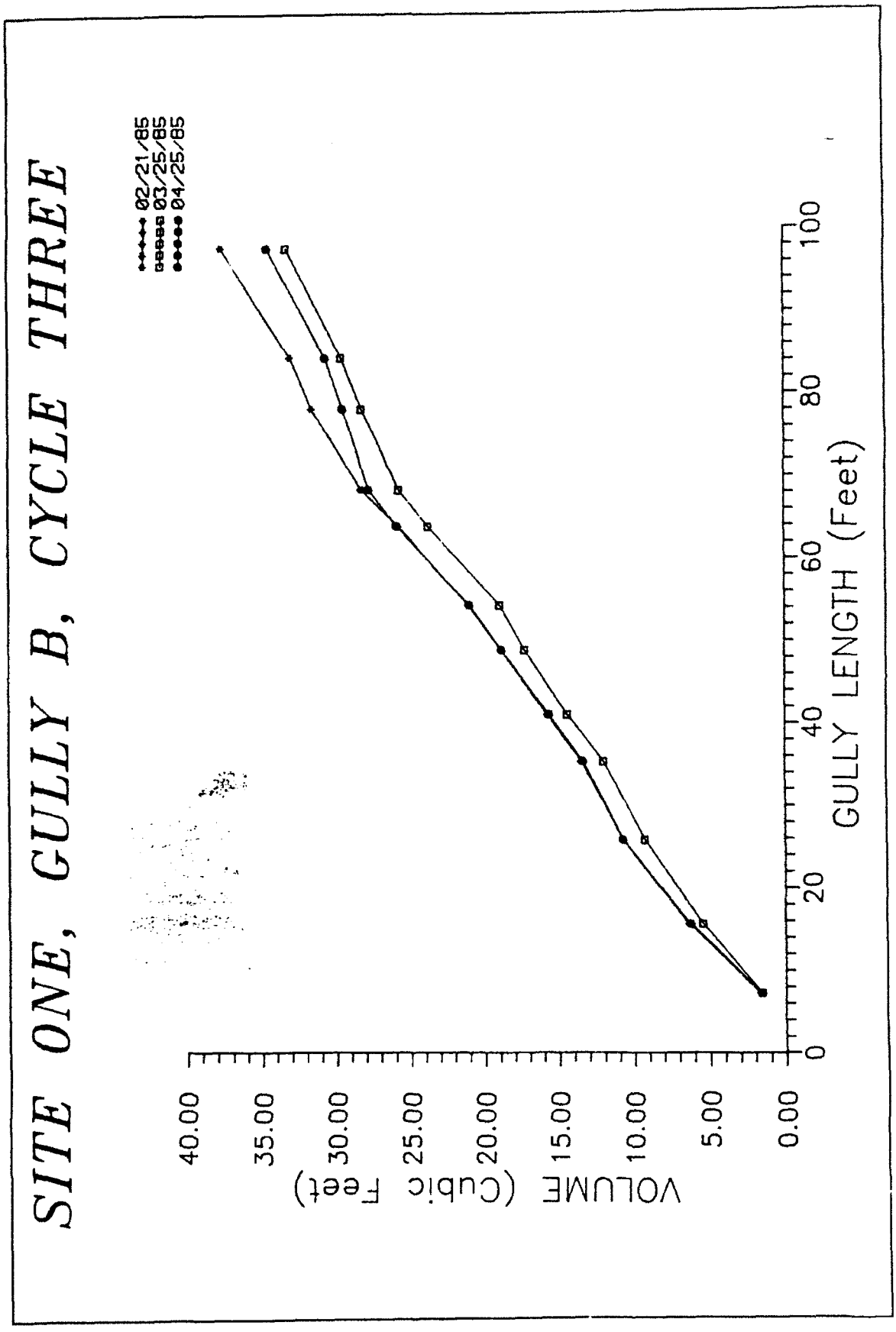
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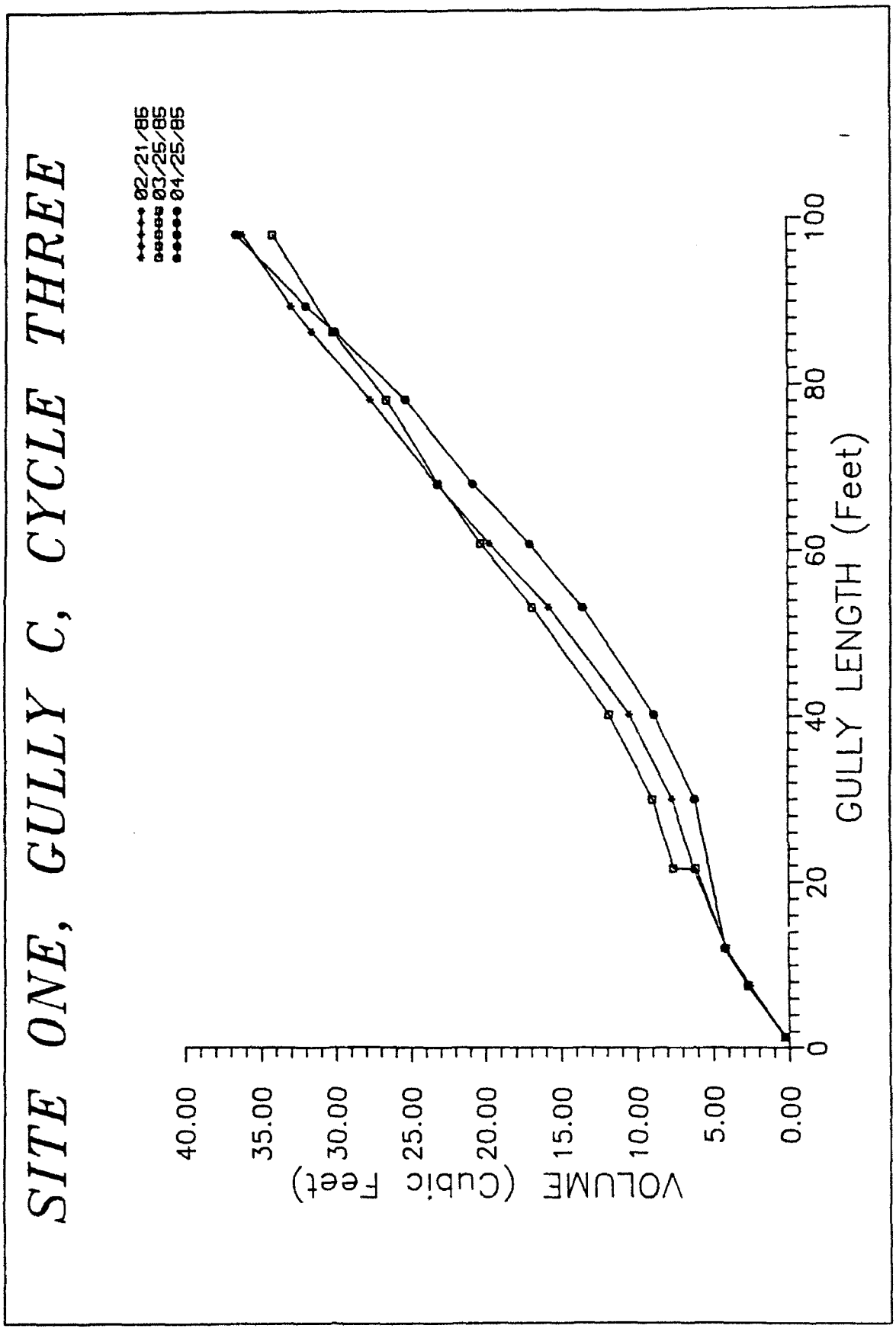
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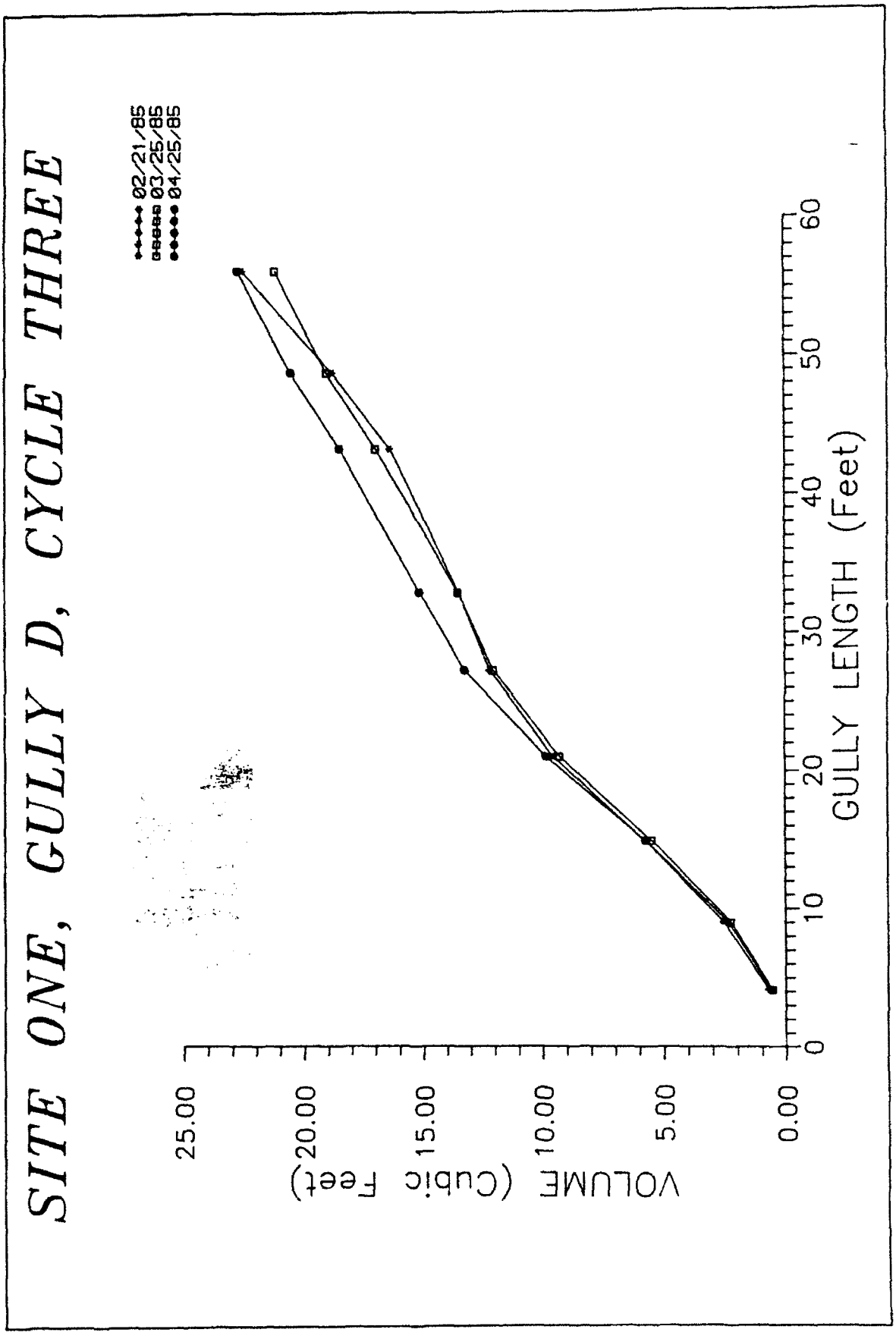
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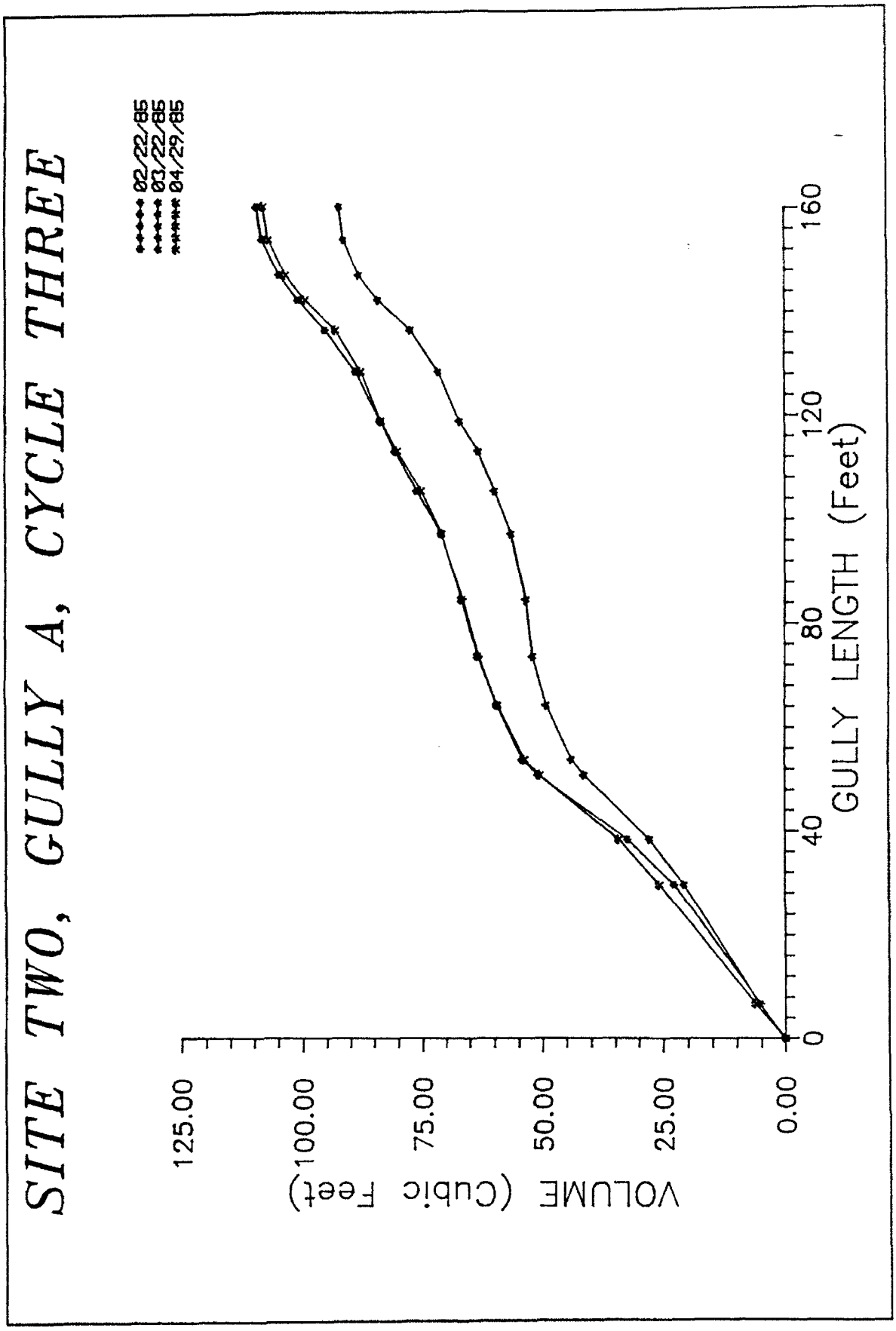
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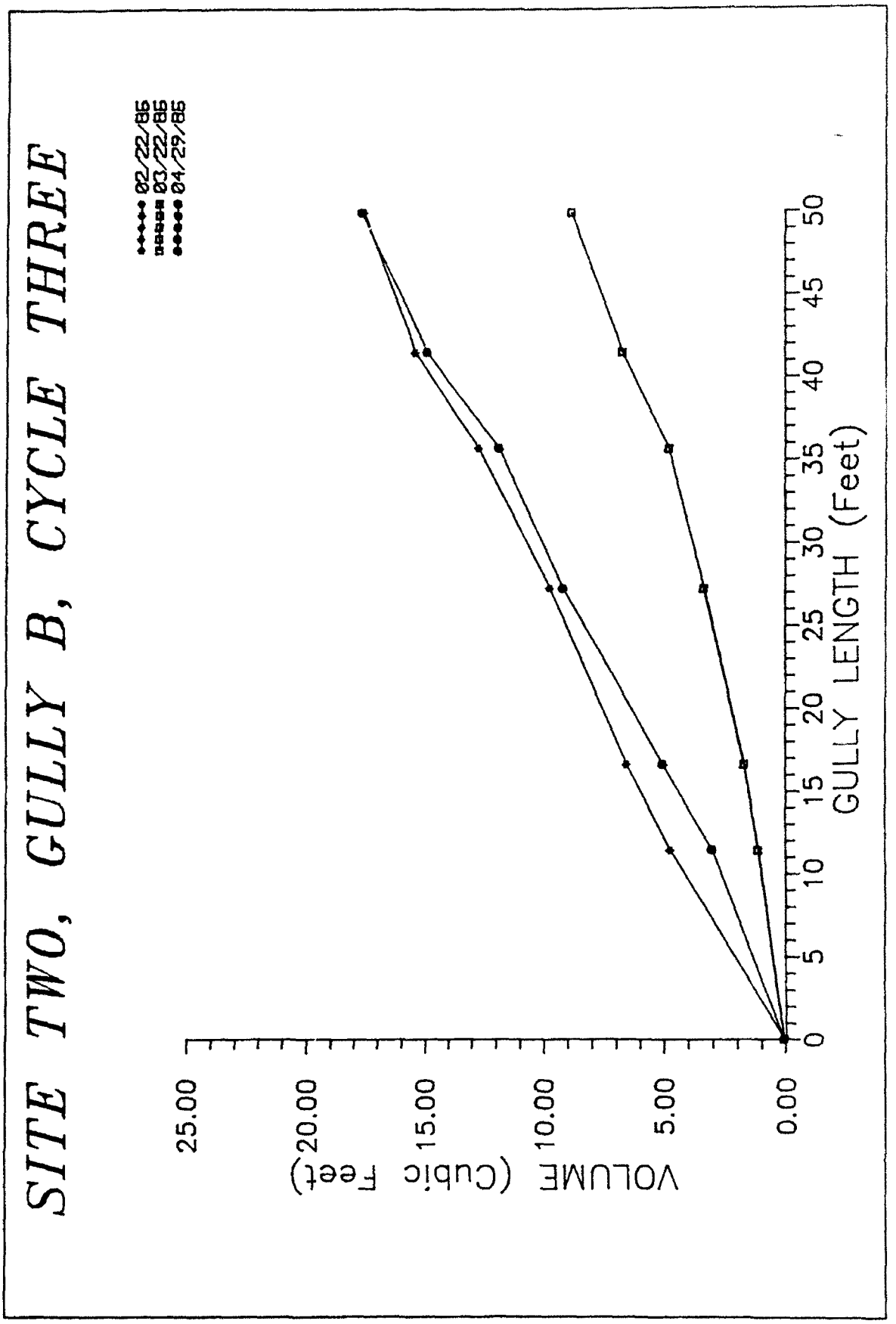
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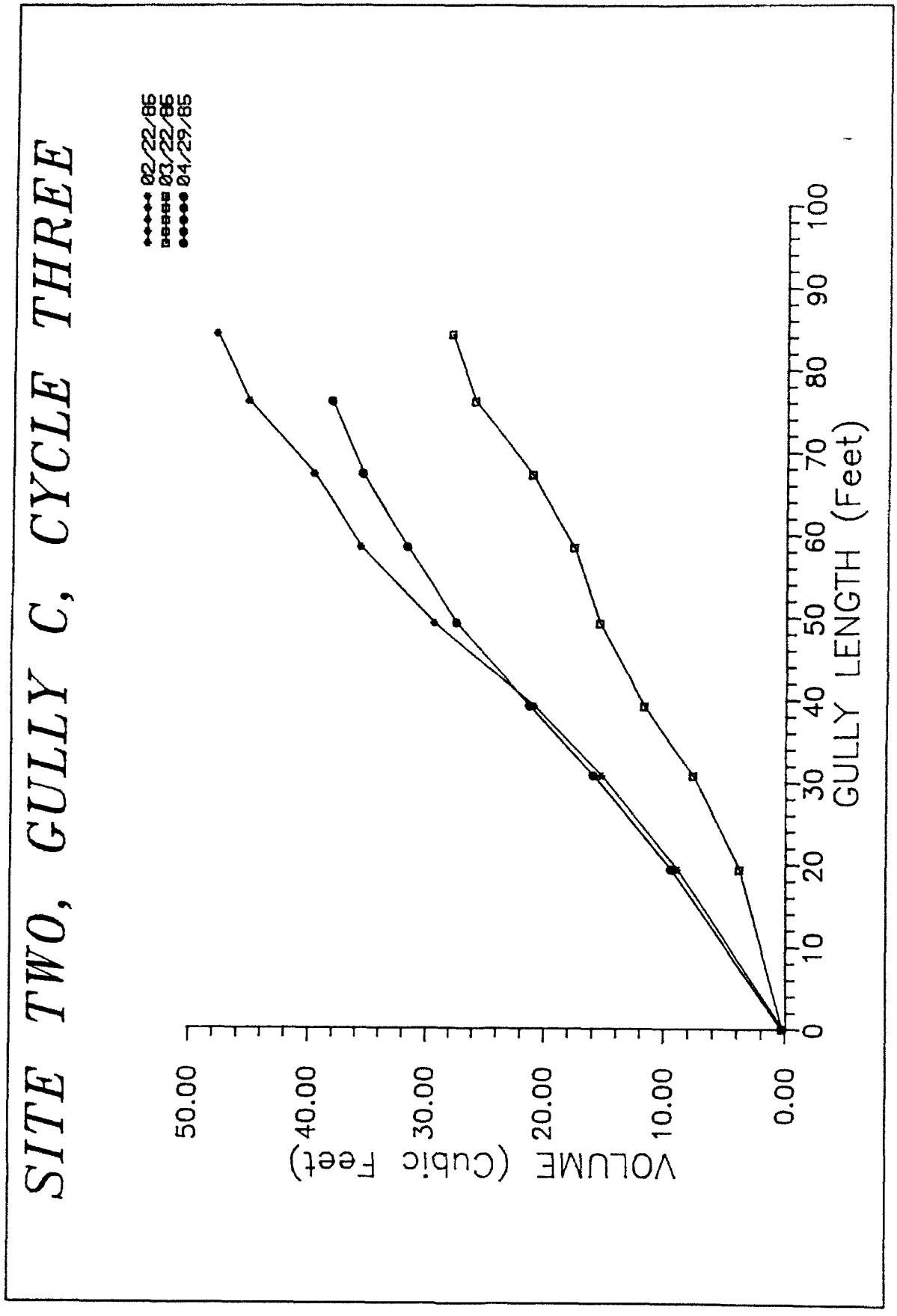
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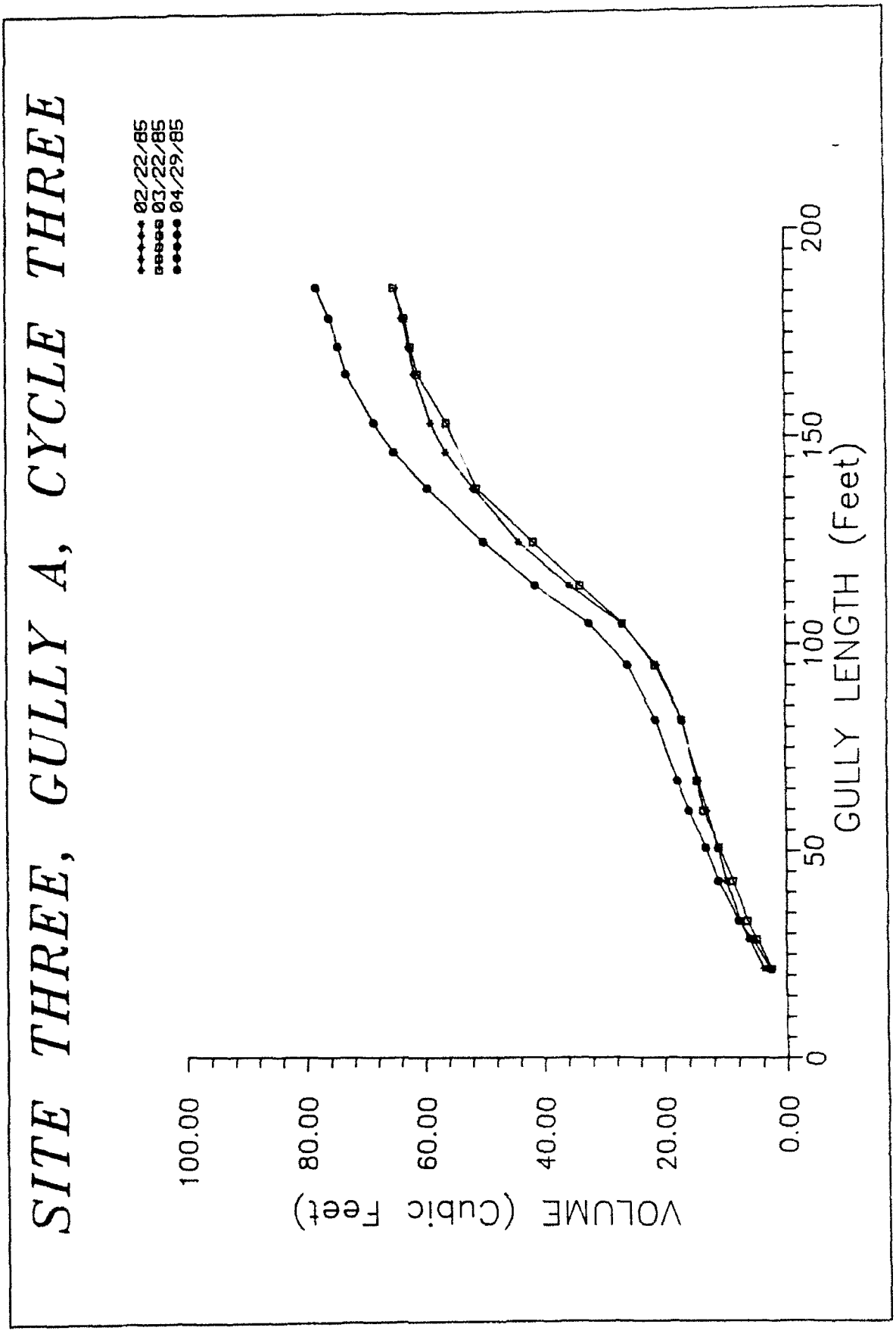
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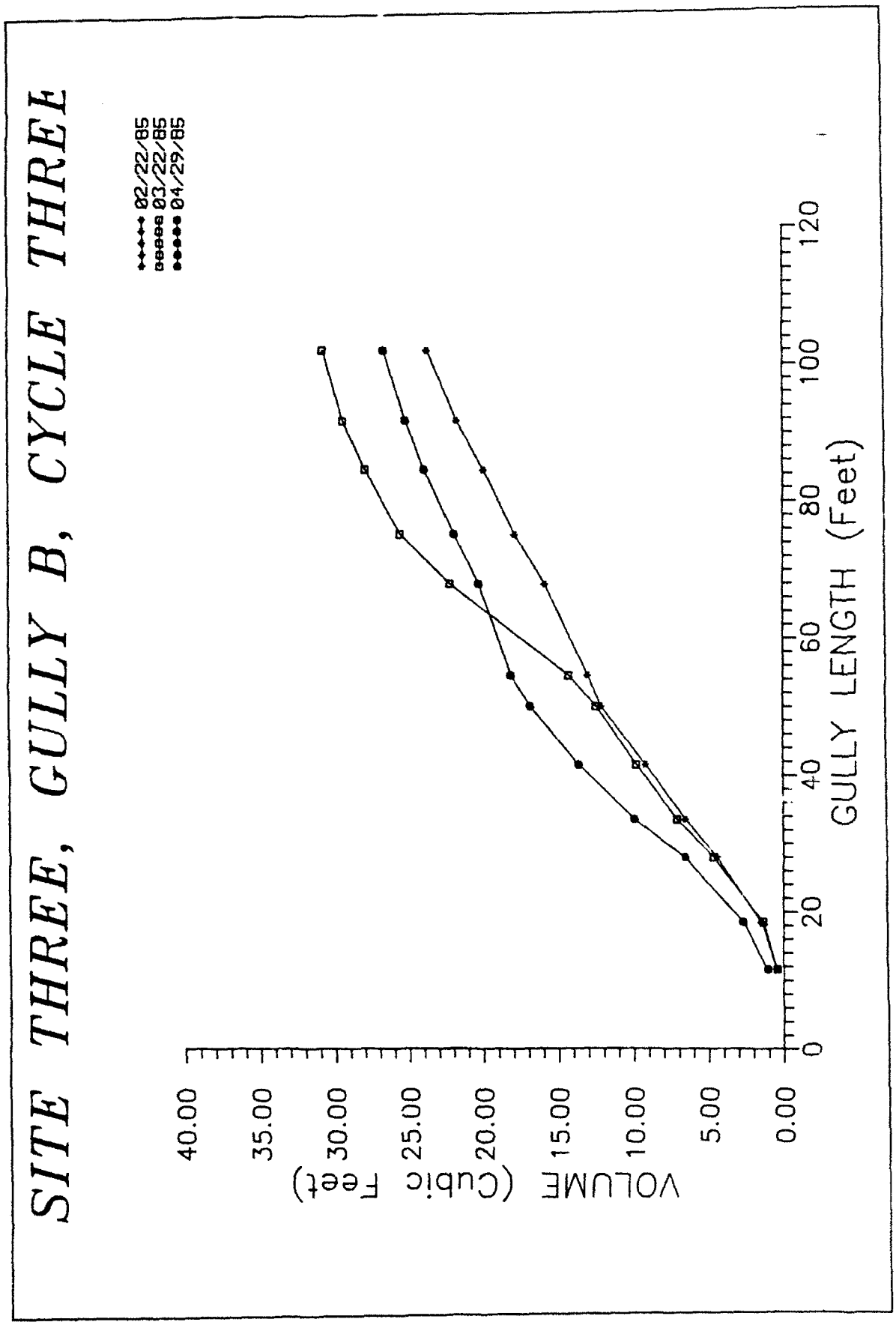
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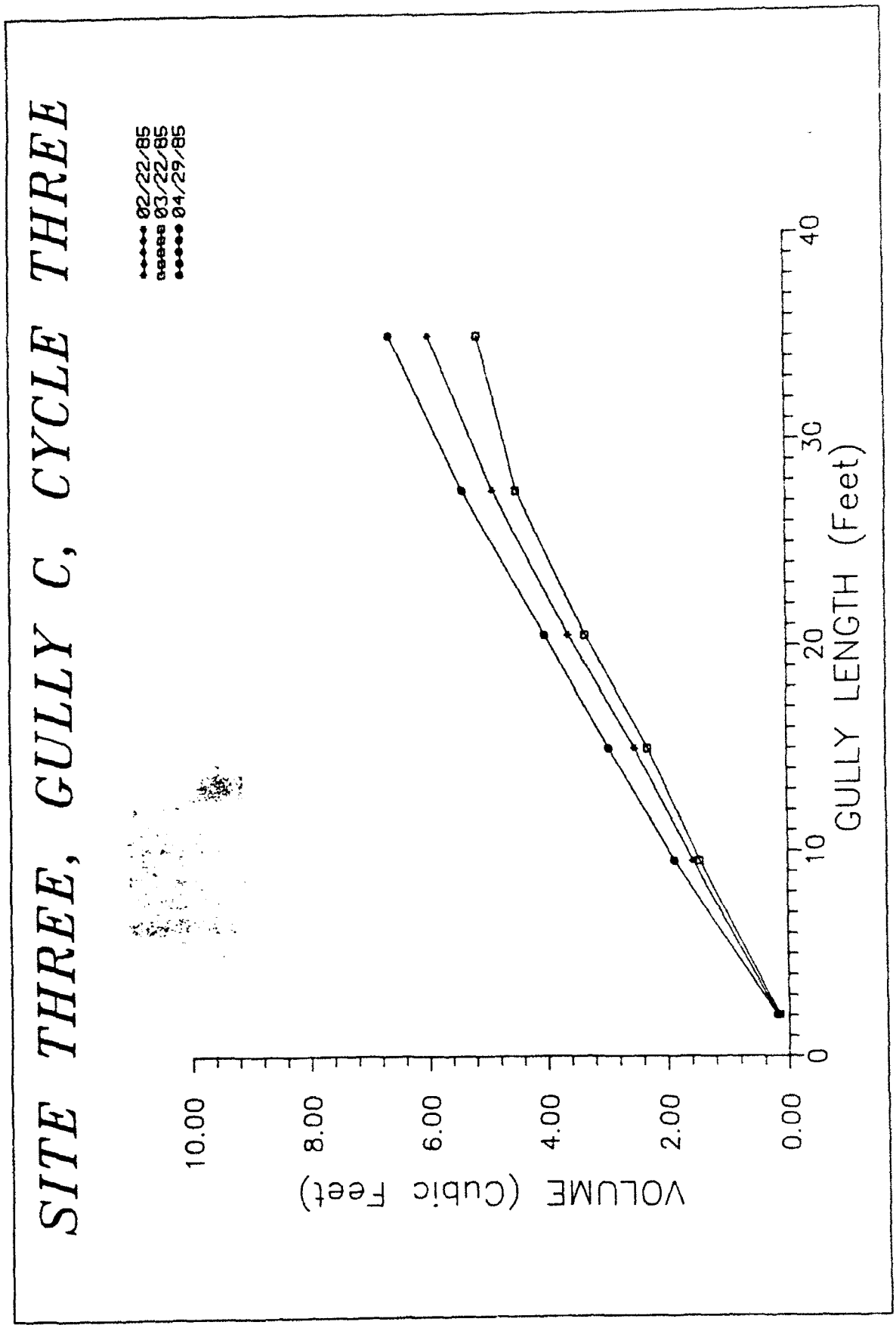
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Appendix G
Photogrammetric Measurement of Gullies

SCOPE OF WORK

PHOTOGRAMMETRIC MEASUREMENT AND ANALYSIS OF EPHEMERAL GULLIES

1. Project Description: The Geotechnical Laboratory (GL), WES is presently conducting a study of soil loss due to the development of ephemeral gullies for the Soil Conservation Service (SCS). An ephemeral gully is defined as an erosional feature resulting from confined surface water runoff, which is larger than a rill and smaller than a permanent gully. For the purposes of this project, a rill is defined as having a top-bank width of less than six inches (15 cm). A permanent gully is an erosional feature which is large enough to preclude cultivation across it by normal farming operations and, therefore, becomes a permanent element of the drainage network. Consequently, an ephemeral gully is defined as having a width of six inches (15 cm) or more and which is plowed over (and partially filled) by normal farming operations.

2. The purpose of the study is to provide data on the erosional development of ephemeral gullies which will be used to derive methods for the prediction of annual soil loss in agricultural fields due to ephermeral gully growth. Data developed by photogrammetric analyses will be used in conjunction with soil, landuse, and meteorological data in the derivation of predictive methods for estimating soil loss.

3. Documentation of the development of ephemeral gullies will be accomplished by photogrammetric procedures. Large scaled (1:300) photogrammetrically derived topographic maps of an experimental site will be produced for two dates (tentatively May 1985 and March 1986) for comparison and volumetric change analysis. The experimental site is described as follows:

NW, SE, Sec 18, T6N, R2W; 1.5 miles northeast of Bolton, MS in Hinds County; size, approximately 10 acres; local relief about 11 feet; current land use, cotton.

Topographic maps constructed of the experimental site will have contour intervals of sufficient frequency to show all ephemeral gullies within the site boundaries. Volumetric calculations of the ephemeral gullies will be conducted through the analysis of digital terrain models compiled from photogrammetric data.

4. Work to be Performed by Contractor: The contractor will be responsible for the following:

a. Development of ground control network accurate to at least 1:10,000. A local coordinate system may be used which may not be tied to local permanent geodetic control points. At least five semipermanent monumented control points will be established on the site. Accuracy of the ground control network will be subject to independent verification.

b. Specification of flight lines. A sufficient number of flight lines will be determined and plotted for the site to insure adequate coverage by the photogrammetric models.

c. WES will acquire the aerial photographs. High resolution panchromatic aerial photography (9"X9") will be made using a standard calibrated metric photogrammetric camera. An uncontrolled mosaic of aerial photographs and two copies of the individual aerial photographs will be supplied to the contractor for each date of photography. The aerial photographs will conform to mapping accuracy standards appropriate for the accuracy and scale of the photogrammetric products.

d. Production of large scale (1:300) topographic maps. For each date of photography (two dates), a photogrammetrically derived topographic map will be produced for the experimental site. The maps will be at the scale of 1:300 and be drafted onto translucent (or transparent) stable base material. All ephemeral gullies, as defined in paragraph 1 above, will be shown on the maps by detailed contour lines (contour interval 0.5 feet).

e. Volumetric analysis of the ephemeral gullies. Computerized photogrammetric data will be used to construct digital terrain models for the site. The digital terrain models will be analyzed to calculate the volume of each ephemeral gully for each date and to illustrate graphically the growth of the ephemeral gullies between the two dates of measurement. After the maps for the second date of photography have been compiled, changes in the density, length, area, depth, and volume of the gullies will be analyzed.

f. The topographic maps and volumetric calculations will be supplied to WES no later than 45 days after the date of the acquisition of the aerial photography.

5. Assistance Supplied by WES. WES will assist the contractor in locating the experimental site. WES will also install the monumented control points on the site to be surveyed by the contractor. WES will also assist the contractor in other appropriate tasks necessary to the accomplishment of the objectives of the project as appropriate.

LRMS
Laboratory for Remote Sensing and Mapping Science
Roy A. Welch Ph.D. Director

Dr. Lawson Smith
U.S. Army Corps of Engineers
Waterway Experiment Station
3909 Halls Ferry Road
P.O. Box 631
Vicksburg, MS 39180

May 19, 1987

Dear Dr. Smith,

With reference to purchase order DACW39-85-M-2368, "Photogrammetric Measurement and Analysis of Ephemeral Gullies", please find enclosed one mylar and one paper copy of each of two maps of Gully Erosion Site #3, near Bolton, Mississippi. The maps of 1:300 scale (C.I. = 0.5 foot and 1 foot) were prepared by photogrammetric techniques from large scale aerial photographs (approximately 1:2200 scale) recorded on May 4, 1985 and January 13, 1987.

The total change in volume in the gully area between the two dates is -4067 cubic feet. The total surface area of all of the gully segments in the system (delineated as the shaded area on the January 13 map) is 0.243 acres, or 10572 square feet. These measurements are summarized on the attached sheet along with a diagram illustrating which segment of the gully is represented by each measurement.

These maps and data complete the requirements for this project. If you have any questions, please call me at the number given below.

Sincerely yours,

Roy Welch

Encl: Four (4) map sheets.

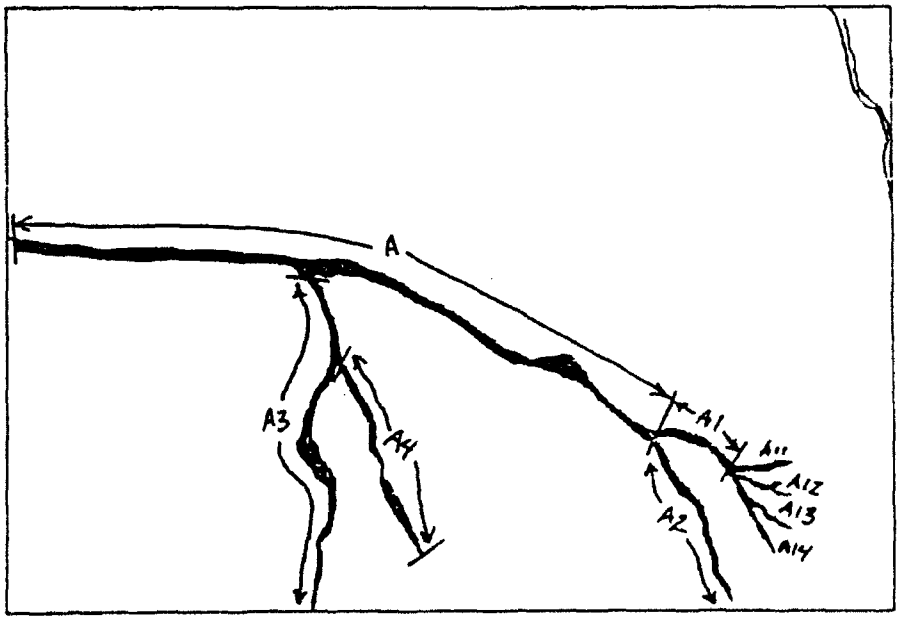
Department of Geography University of Georgia Athens, Georgia 30602 (404) 542-2359 Telex 499 999 1619

Laboratory for Remote Sensing and Mapping Science (LRMS)
Department of Geography - University of Georgia
Athens, Georgia 30602 (404) 542-2359

SUMMARY OF RESULTS
Bolton, MS

Gully Segment	Measured Length	Measured Surface Area	Computed Width	Measured Depth	Measured Vol. Change 5/4/85-1/13/87
A	521 ft	5269 sq ft	10.1 ft	0.58 ft	-2081 cu ft
A1	85	547	6.4	0.82	-350
A11	55	218	4.0	0.70	-41
A12	53	187	3.5	0.65	-31
A13	48	129	2.7	0.86	-40
A14	80	229	2.9	0.65	-114
A2	165	808	4.9	0.69	-344
A3	322	2078	6.5	0.42	-736
A4	194	1107	5.7	0.53	-330

Total gully surface area : 10572 sq ft (.243 acres)
Avg. gully width : 6.9 ft
Avg. gully depth : 0.656 ft (7.9 inches)
Total volume change : -4067 cu ft



Gully Segment Designation

REPORT DOCUMENTATION PAGE

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1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	August 1993	Final report

4. TITLE AND SUBTITLE
Investigations of Ephemeral Gullies in Loessial Soils in Mississippi

5. FUNDING NUMBERS

6. AUTHOR(S)
Lawson M. Smith

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
U.S. Army Engineer Waterways Experiment Station
Geotechnical Laboratory
3909 Halls Ferry Road
Vicksburg, MS 39180-6199

8. PERFORMING ORGANIZATION REPORT NUMBER
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GL-93-11

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100 West Capitol Street
Jackson, Mississippi 39269

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11. SUPPLEMENTARY NOTES
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Approved for public release, distribution is unlimited.

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

Soil loss from agricultural fields due to the development of annual ephemeral gullies may equal or exceed the amount of soil loss from sheet and rill erosion. At the present, there are no widely used procedures for estimating the amount of soil loss produced by the annual development of ephemeral gullies. The purpose of this investigation was to obtain detailed data on the development of ephemeral gullies at four sites in west-central Mississippi over several years. The objectives of the study were to (1) establish four measurement sites in loessial soils, (2) develop an accurate and efficient procedure for measuring ephemeral gullies, (3) gather data which describes the development of the gullies through the cropping cycle, (4) provide additional estimates of the amount of soil loss in tons/acre/year due to ephemeral gullies, and (5) provide recommendations on the use of the data and procedures for acquiring additional data.

Gullies were measured in the field using the "gulliometer" for three cropping cycles during 1983-1985. A total of 1,350 gully cross-sections were measured in the field. Meteorological stations were also maintained at the sites during the period of measurement. Gullies were measured at site three photogrammetrically for the period 3 May 1985 to 13 January 1987. Field measurements reveal that although gullies typically go through periods of erosion

(Continued)

14. SUBJECT TERMS
Ephemeral gullies
Gulliometer
Loessial soil
Photogrammetry
Soil erosion
Soil measurement

15. NUMBER OF PAGES
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16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
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13. (Continued).

and deposition during a cropping cycle, much of the linear development of the gully channel occurs within two months after planting during normal precipitation. After the crop is harvested, the gullies deepen over the fall and winter.